MOUNTAIN PINE BEETLE INFESTATION IN LODGEPOLE PINE

TARGHEE - TETON PROJECT

1948

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Division of Forest Insect Investigations

During the period August 23 to October 25, 1948, a survey was made of the lodgepole pine type in the Targhee-Teton insect control project area to determine the status of the mountain pine beetle outbreak following the 1948 attack period. Located in southeastern Idaho and northwestern Wyoming, the project area includes parts of the Caribou, Bridger, Targhee, and Teton National Forests; Grand Teton National Park and Jackson Hole National Monument. The area of active infestation now covers over 200,000 acres. The infested area, although covering parts of several forests, a National Park and Monument, is considered a single outbreak. The enclosed maps will show the location and relationship of the control units into which the area has been divided.

Funds for the survey were allotted by the Forest Service and by the Park Service in proportion to the acreage covered. Supervision of the survey was under the direction of the Bureau of Entomology and Plant Quarantine. A detailed description of the methods and survey organization is given at the end of this report.

The purpose of this report is to present an analysis of the data and information obtained during the survey. This information has a two-fold purpose; it serves as a measurement of the effectiveness of control work and as the basis for estimating the funds, and man-power needed for further work.

Surveys were also made in 1946 and 1947. Because the details of the development of this outbreak has been given in these reports, there is no need to go into the history of this infestation other than to summarize the data previously presented.

1946: From surveys of the Targhee, Teton and Bridger Forests, and on the Grand Teton Park, plus a visual estimate of the infestation on the Caribou Forest, the total number of infested trees was thought to be 213,000 at that time. Control measures were undertaken in 1947 against a part of that infestation; concentrating, then, on the infested areas of the Targhee, Teton Forests, and in Teton Park. During the 1947 control project, 43,148 infested trees were treated. Funds were not sufficient to complete the work on the areas undertaken so that the control measures of that period should be regarded more as a holding action than a cleaning up.

1947: Surveys made during the fall of 1947 showed that the infestation on the Targhee, Teton, Bridger, and park areas had reached 104,000 infested trees. No survey of the heavily infested portions of the Caribou were made but an estimated 5,000 infested trees along the Snake River were added to the above total, bringing the grand total to 109,000 trees to be treated during the spring of 1948. Actually, several thousand infested trees were treated late in the fall of 1947. Including the fall work, 114,170 trees were treated on these areas.

With the exception of the Caribou, most of the areas treated were cleaned up as well as possible considering the size of the project and the short period available for the work. To measure the effectiveness of the control work the following table is given showing the reinfestation on the areas where control measures were completed:

Forest Area	Infested Trees Est. 1947	Trees Treated	Est. 1948	Percent Change
Caribou	5,000	4,160	810	- 80.5%
Bridger	6,000	4,898	128	- 97.4
Targhee	32,061	52,129	17,494	- 66.4
Teton	59,294	46,650 *	6,096	- 86.9
G.T.N.P.	6,687	6,333 **	3,246	- 48.7
	109,042	114,170	27,774	- 75.7

* 5,195 treated fall of 1947

** 884 " " " "

The survey of 1948 was directed to the task of determining the full extent of the infestation throughout the project area and adjacent stands. It is felt that the survey was sufficiently complete to give this information within reasonable limits. The Caribou National Forest presented the greatest problem. On other forests the lodgepole pine type was fairly well known and type maps were available from which host type maps were made. On the Caribou, however, type maps made from the best available information were far from accurate. The type data was just not available. As a consequence, a very high percentage of the survey man days were spent on obtaining type data. The low percentage of coverage on the Caribou is the result of the work necessary in obtaining this information.

At the close of the survey a meeting was held in the Regional Office in Ogden, Utah where a preliminary report of the survey was presented. The meeting was attended by Regional Office and Forest personnel; by representatives of the Park Service and Bureau of Entomology and Plant Quarantine. At that time a tentative decision was reached as to the action to be taken in the event of control. These recommendations for each unit are given in the following table which gives the data obtained on all the units into which the project area has been divided.

INSECT SURVEY OF MOUNTAIN PINE BEETLE INFESTATION IN LODGEPOLE PINE

1948
Caribou National Forest

PAGE	Unit	No.	Approx. acres of type	New Attacks per acre	1948 Inf.	Percent Survey	Action Recommended Ogden Meeting
5	North Caribou Basin	1	9,800	.35	3,430	1.6	Spot and treat
7	South Caribou Basin	2	6,400	.30	2,000	1.4	Spot and treat
8	McCoy Creek	3	5,800	1.17	6,800	1.4	Spot and treat
9	Bitters Peak	4	2,000	1.30	2,600	1.9	Spot and treat
9	Trout Creek	5	1,500	.17	250	2.3	Scout late and "hot spot"
10	Jackknife Creek	6	2,700	.17	460	2.2	Scout late and "hot spot"
11	Diamond Flats	7	4,000	.47	1,880 ✓	1.8	Spot and treat
11	Deer Cr.-Diamond Ridge	8	400	.75	300 ✓	6.0	Spot and treat
12	Sheep, Olsen & Kendall Can.	9	1,100	.18	200 ✓	4.4	Spot and treat
	Snake River	10	3,000	.27	810	2.0	Spot and treat
	Bear Creek	11	7,500	.93	7,000	.8	Spot and treat
	Scattered areas no listed				1,000		Fly and treat
			44,200		26,730		26,730 trees to be treated on 44,200 acres.

INSECT SURVEY OF MOUNTAIN PINE BEETLE INFESTATION IN LODGEPOLE PINE

1948

Bridger National Forest

Unit	No.	Approx. acres of type	New Attacks per acre	1948 Inf.	Percent Survey	Action Recommended Ogden Meeting
Greys River and Little Greys River	12	6,400	.02	128	4.4	No action recommended
Roose Creek	13	620	.03	18	5.2	No action recommended
Small areas along Snake and Salt Rivers	13 A	400	1.2	500		Spot and treat
		7,420		646		500 trees to be treated on 400 acres.

TARGHEE NATIONAL FOREST

Unit	No.	Approx. Acres of Type	New Attacks Per Acre	1948 Inf.	Percent Survey	Action Recommended Ogden Meeting
Alpine	14	4,400	.24	1,056	4.1	Spot and treat
Burns Canyon	15	600	.13	78	3.3	Hot spot and treat
Hawley Gulch	16	10,500	.23	2,415	4.2	Spot and treat
Hinkley Creek	17	5,550	.21	1,166	4.7	Spot and treat
Mud Springs	18	7,680	.08	614	4.7	Fly, hot spot and treat
Canyon Creek	19	5,064	.07	354	3.0	Fly, hot spot and treat
Kirkham Hollow	20	1,096	.40	438	5.9	Spot and treat
Calamity Creek	21	3,592	.004	-	6.2	Aerial scouting
Horseshoe - Packsaddle	22	9,769	.02	195	3.5	Aerial scouting
Twin Creeks	23	942	.14	132	3.8	Spot and treat
Mahogany Creek	24	5,430	.09	488	2.5	Spot and treat lower part
Henderson-Drake	25	3,100	.16	500	4.3	Spot and treat
Upper Trail Creek	26	864	.12	103	4.6	Spot and treat
Lower Trail Creek	27	1,800	.03	94	3.2	Scout (late)
Moose Game & Sweet Creek	28	1,150	.37	425	4.6	Spot and treat
Little Pine to Nordell Can.	29	5,000	.11	550	2.8	Spot and treat
Rainey Creek	30	2,200	.20	440	5.0	Spot and treat
North Pine	31	5,900	.32	1,880	4.0	Spot and treat
West Pine	32	2,000	.47	940	3.5	Spot and treat
Lower Pine	33	800	.14	112	3.6	Spot and treat
Mike Spencer	34	1,800	1.03	1,854	4.3	Spot and treat
Tie Canyon	35	2,800	.43	1,200	4.5	Spot and treat
Dog Creek	36	2,000	.06	120	4.3	Scout for groups
Cabin Creek	37	1,800	.08	144	3.9	Scout for groups
Elk Creek	38	1,500	.60	900	5.0	Spot and treat (by Teton Forest)
Squirrel Creek	39	18,000	.07	1,260	2.1	Aerial scouting, spot and treat about 6,000 acres
Porcupine	40	13,000	.11	1,430	3.2	Aerial scouting, spot and treat about 6,000 acres
Falls River	41	14,000	.01	-	.7	No action
Spring Creek	42	600	.56	336	9.0	Spot and treat
Green Canyon	43	5,000	.50	2,500	3.8	Spot and treat
Bear Canyon	44	3,600	.04	144	3.9	Aerial spotting and tre at any groups found
Thurman Ridge	45	1,200	.03	36	2.7	Aerial spotting and treat any groups found
Bishop Mt. - Antelope Flats	46	5,000	.05	250	1.8	Aerial spotting and treat any groups found
Hotel Creek	47	12,000	.21	2,500	3.6	Spot and treat
Yale Creek to Stamp Medows	48	10,000	.004	—	2.1	No action
Buffalo Riv. to Big Spgs.	49	20,000	.0	00	1.5	No action
Island Park and Split Cr.	50	36,000	.0	—	.7	Fly head of Split Creek
Big Bend	51	35,000	.004	—	.6	No action
Osborne Spgs. - Lower Falls	52	40,000	.0		.4	No action
		300,737		24,614		

24,614 trees to be treated on 85,232 acres includes 1911 to be picked up through aerial spotting and scouting on Units, 18, 19, 22, 27, 36, 37, 44, 45 and 46.

TETON NATIONAL FOREST

Unit	No.	Approx. acres of type	New Attacks per acre	1948 Inf.	Percent Survey	Action Recommended Ogden Meeting
Wilson Highway North	53	1,987	.15	300	5.9	Spot and treat
Wilson Highway South	54	4,570	.21	960	3.7	Spot and treat
Mosquito Drainage	55	5,300	.24	1,272	4.9	Spot and treat
Taylor Mt.	56	3,860	.22	849	3.9	Spot and treat
Falls Creek	57	7,680	.18	1,382	3.7	Spot and treat
Coburn Creek	58	2,000	.14	280	5.3	Spot and treat
Bailey Creek	59	700	.13	91	8.4	Spot and treat
Willow Creek	60	2,240	.01	22	6.3	No action
Buck and Lime Creek	61	500	--	--	--	No action
Granite Creek	62	3,000	.07	210		Spot and treat 1,000 acres
Little Horse Creek	63	300	.15	45	4.3	Spot and treat
Game Creek & Wilson Canyon	64	2,500	.16	400	6.4	Spot and treat 200 acres having 200 tree "hot spot"
Cache Creek	65	1,020	.32	326	4.7	Spot and treat
Sheep Creek	66	970	.28	187	10.3	Scout and treat, Estimate includes 100 W.B.P.
Ditch, Turpin & Lost Creek	67-68	5,320	.30	1,550	3.7	Spot and treat
		41,647		7,874	7,652 trees to be treated on 34,907 acres	

GRAND TETON NATIONAL PARK AND JACKSON HOLE NATIONAL MONUMENT

Unit	No.	Approx. acres of type	New Attacks per acre	1948 Inf.	Percent Survey	Action Recommended Ogden Meeting
Signal Point	1	3,000	.44	1,322	4.4	Spot and treat
Burnt Ridge	2	1,800	.07	125	4.3	Scout edges and treat 100 acres in 46 small patches between Burnt Ridge & Snake R.
Jenny Lake	3	700	.04	28	3.9	Spot and treat
Headquarters	4	2,500	.28	710	7.4	Spot and treat
Windy Point	5	3,000	.29	729	5.1	Spot and treat
J.Y. Ranch	6	4,150	.95	3,949	5.6	Spot and treat
Timbered Island	7	600	.19	114	7.2	Spot and treat
Blacktail Butte	8	250	.50	125	9.6	Spot and treat
Jackson Lake	9	8,500	.06	510	2.1	Spot and treat 1550 acres with 248 trees
Ditch Creek & Snake River	10	450	.63	284	9.1	Spot and treat
		24,950		7,896		7,634 trees to be treated on 18,000 acres.

An analysis of the foregoing tables show that control measures have been recommended to treat 67,130 infested trees on 182,739 acres. This area has been broken down into units to facilitate control and survey operations. In the following pages, 1" to the mile scale maps showing the location and boundaries of the units and as much detailed description as is available will be given.

Estimates of man days or control camps needed are based on previous control records in similar areas and are only approximate. They are offered as suggestions only and with the hope that they will be of some use in organizing a control project. Obviously, any local errors in the estimated number of infected trees - any improvement in treating methods would alter the treating needs.

CARIBOU NATIONAL FOREST

Unit No. 1	9,800 acres
North Caribou Basin	3,430 inf. trees

Here is thought to be the starting point of the Targhee-Teton mountain pine beetle outbreak. The infestation within this unit has been epidemic over a longer period than on any other unit of the project area. As a result, the timber has been depleted to a point where only a small percentage of the original mature stand remains. Visual estimates indicate 90 percent kill. The outbreak is over in this area. The damage has been done and the decline in numbers of infested trees has been rapid. Control measures are only considered as a protection to other, adjacent areas. The infested trees remaining could still be a source of reinfestation.

The host-type map of this unit is only approximate. Based on forest type maps corrected to some extent by survey strips, the type bounderies and marginal areas need further correction.

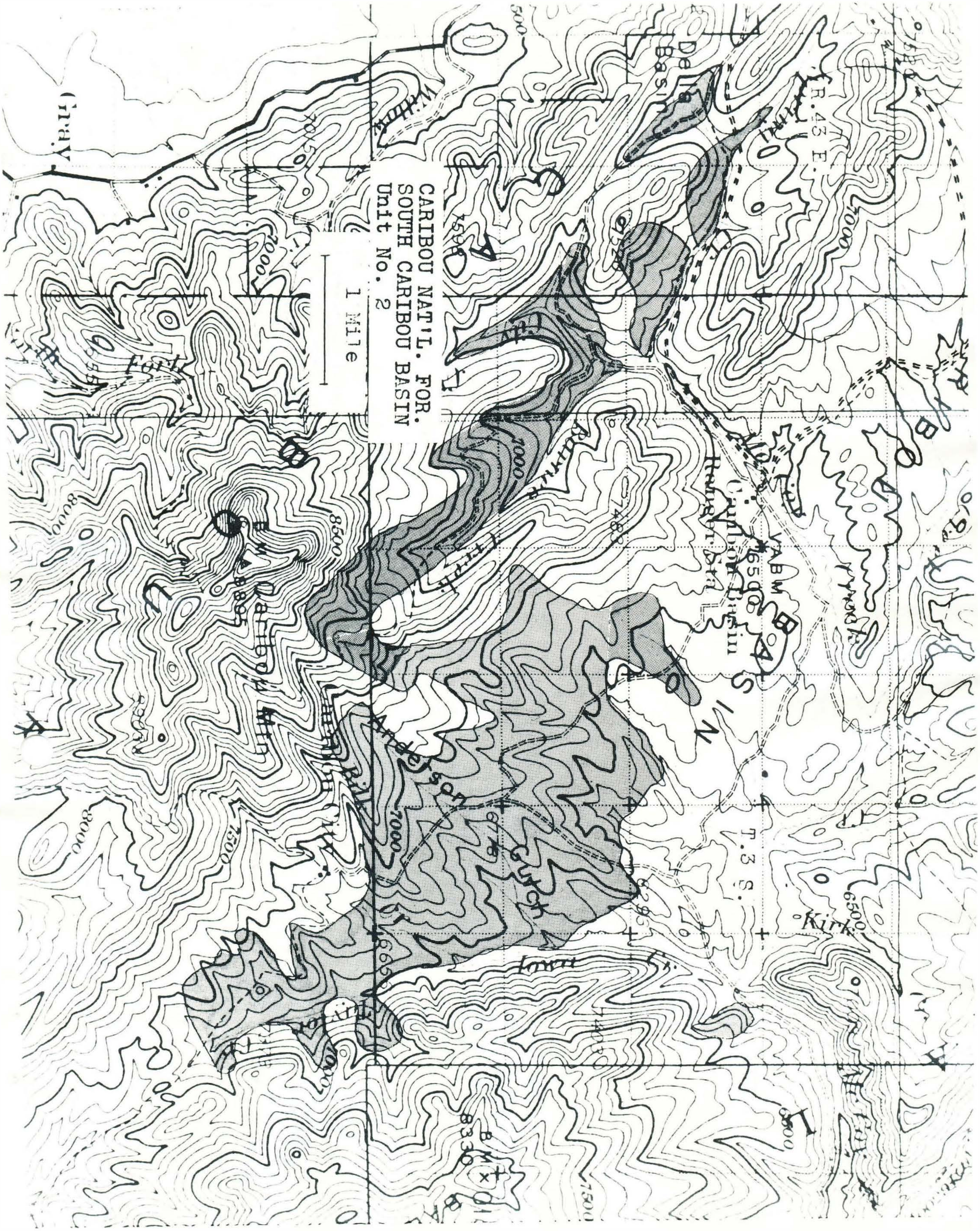
From a treating standpoint, most of this area is relatively flat. Four wheel drive vehicles should be able to drive to much of it without extensive road building. Wood roads are numerous along the southwestern part branching off from the main road that is shown. The bug-killed timber is cut for mine props in the more accessible areas; therefore, more recent road development is common to this area than on other parts of the forest. Dead limbs and windfalls from the bug kill was beginning to form a noticeable amount of ground litter during the fall survey. Heavy winter snows or a windstorm could make this area difficult to get around in very quickly.

Spotter training will need special emphasis for this unit because, as in all older infestations, there are many pitched-out attacks and many trees with strip attack, one-sided attacks and many in the doubtful class.

As a result of the long duration of this infestation the attacks are fairly evenly distributed throughout the area.

A combination spotter-treater crew equipped with hand pumps and pack stock would probably work well in this area.

Past experience would indicate that approximately 925 man-days would be required to spot and treat this area. This would call for one 25-man camp for a 40 day working period. The camp should be located somewhere along the main road crossing the area.



CARIBOU NAT'L. FOR.
SOUTH CARIBOU BASIN
Unit No. 2

1 Mile
CARIBOU BASIN
Caribou Basin Ranger Sta.
VABM 6500
Della Basin
R.43 E.
T.3 S.
Anderson Gulch
Caribou Mtn
Fork
Kirk
Gray
7000
8000
8500
7500
6500

Unit No. 2 6,400 Acres

South Caribou Basin 2,000 infested trees

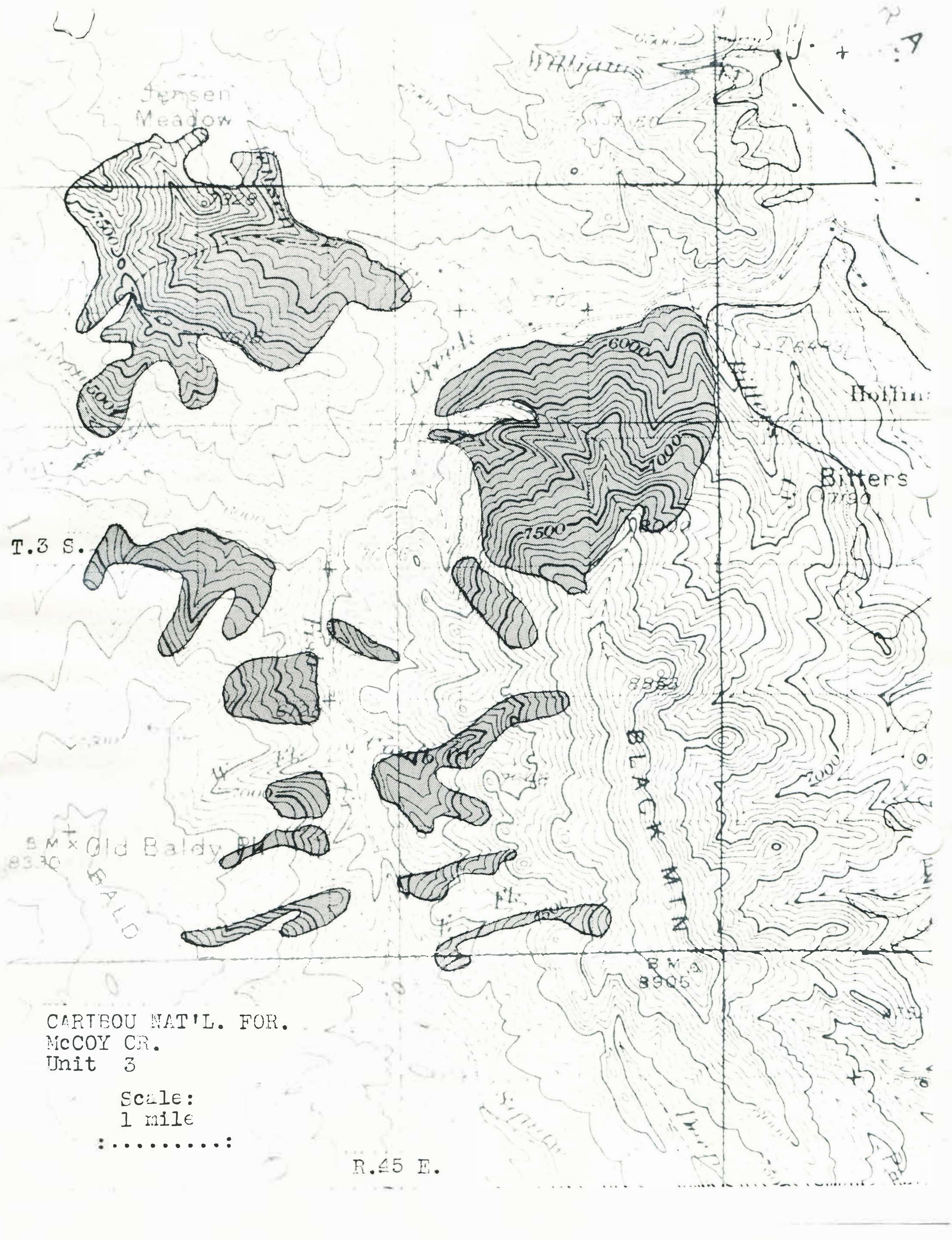
This unit lies south of Unit No. 1, and has a far different infestation. Here the outbreak is in the initial stage with a tendency to group in small widely scattered patches. Most of the infestation is found adjacent to the Caribou City road in Sec. 26, 27, 34 and 35.

The area is not rough and roads cover it well as may be seen from the map. However, the road to Caribou City is not passable beyond the center of Section 35 to anything wider than a jeep. The road between Caribou Basin R.S. and Caribou City is not much used and may not be passable in the spring.

A camp would probably be best located at the Caribou Basin Guard station so that a part of Unit No. 1 could be treated as well as Unit No. 2. Man-day requirements would indicate a 25-man camp for 22 days.

Because of the scattered group nature of the infestation, spotting ahead of the treating might be the best procedure. For treating equipment, a power pump and a few hand pumps would be a good combination.

The host type map of this unit is felt to be fairly accurate.


Jensen Meadow
Williams
Hoffm
Bitters
7790
7649
6000
7000
7500
8000
8863
7000
BLACK MTN
B M
8905
T.3 S.
Old Baldy Pk
8330
BALD
R.45 E.

CARIBOU NAT'L. FOR.
McCOY CR.
Unit 3

Scale:
1 mile
:.........:

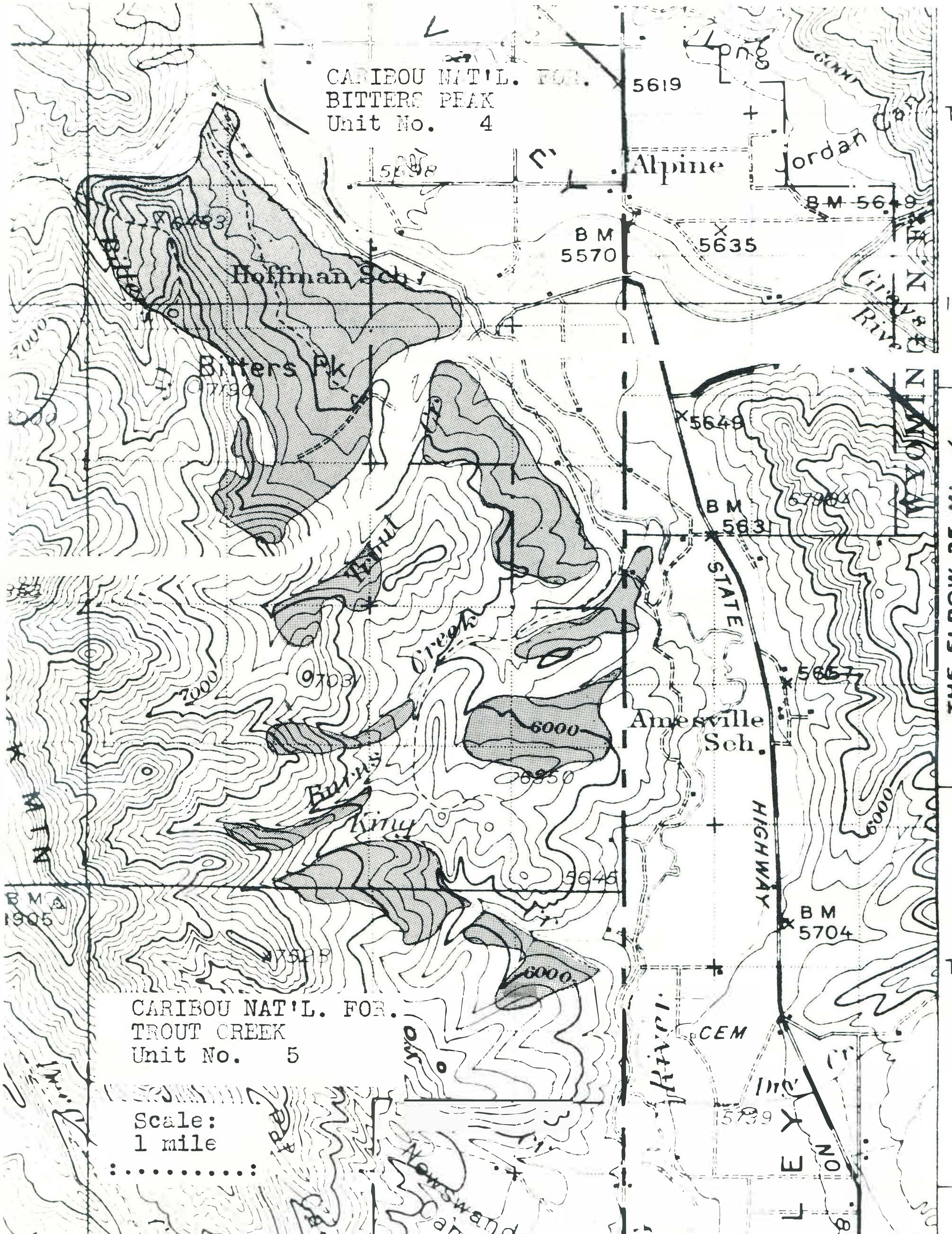
Unit No.3 5,800 acres

McCoy Creek 6,800 infested trees

Made up of a number of scattered areas in moderately rough topography. Roads are few and further road work is probably not advisable. Treating requirements would indicate about 1,000 man-days or a 25-man camp for a 40-working day period. The camp should be located along the main road about a mile below Fish Creek.

The infestation is very heavy (1 to 2 trees per acre) in the areas south of McCoy Creek and very light in the Jensen Creek drainage. To avoid excessive travel with equipment, it is suggested that the Jensen Creek area be fully spotted before treating. Some of the small stringer-like areas of type up Fish Creek could possibly be treated without spotting, although some numerical identification should be given trees treated in this fashion.

Pack stock and hand pumps would be the best equipment for most of this area.



CARIBOU NAT'L. FOR.
BITTERS PEAK
Unit No. 4

CARIBOU NAT'L. FOR.
TROUT CREEK
Unit No. 5

Scale:
1 mile
:..........:

5619
Long
Alpine
Jordan Cn
T. 37 N
BM 5649
BM
5570
5635
5698
6483
Hoffman Sch
Bitters Pk.
7790
7000
Grays River
10
WYOMING
5649
BM
563
5794
THE ELBOW 25 MI.
Trout
Creek
STATE
HIGHWAY
5657
Ameville
Sch.
7031
6000
6850
Burns
King
5646
BM
5704
T. 36 N.
BM
1905
7528
CEM
River
5739
VALLEY
Newswander
Canyon
MTN
R 46 E
BM
5826
89

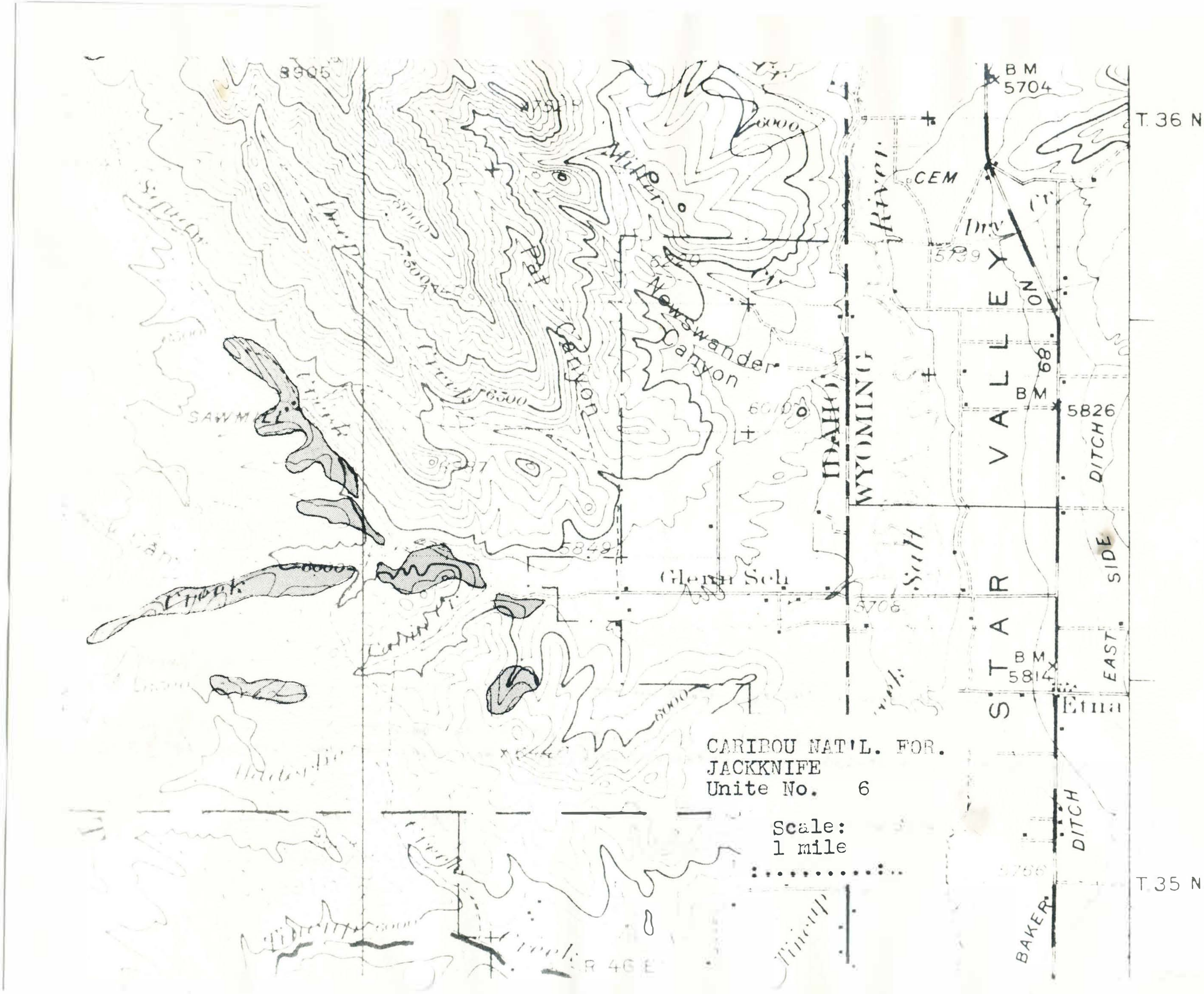
Unit No. 4	2,000 acres
Bitters Peak.	2,600 infested trees

The infestation is both spotty and heavy. The heaviest concentration will be found along the Bitters Peak ridge south of McCoy Creek. This area is quite brushy and steep. The flat, bench-like area between Bitters Peak and the Snake River has relatively large groups and will be easier to work but a few short roads should be built to give easy access to the bench area. From this camp a thorough scouting and treating of the Trout Creek areas (Unit 5) should be undertaken late in June.

Pack stock and hand pumps will be the best equipment for treating this area. It is doubtful if a combination treating-spotting crew could work here because of the difficulty of travel. Most of the area is brushy.

Treatment of this infestation and that on the No. 5 unit is estimated at 530 man-days - a 25 man day camp for 20-day working period. Perhaps this camp could also work the Jackknife drainage and the Bridger patches to finish out the season.

As to camp location, a spot near the Salt River bridge would be well placed. Accuracy of the host type map, fair on Unit 4, poor on Unit 5.



CARIBOU NAT'L. FOR.
JACKKNIFE
Unite No. 6

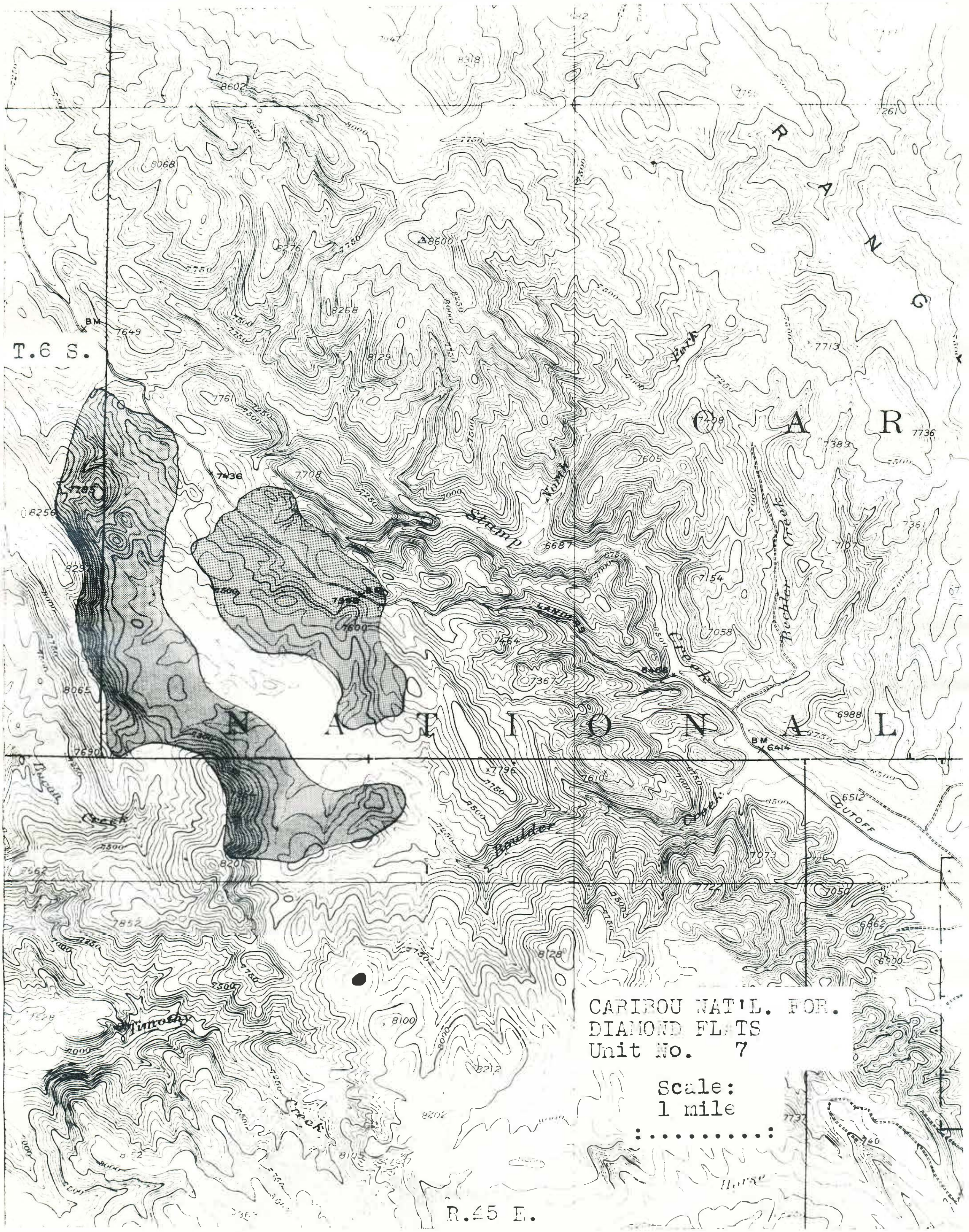
Scale:
1 mile

T 36 N
T 35 N
B M 5704
B M 5826
B M 5814
CEM
Dry Cr.
5739
NO 89
STAR VALLEY
DITCH
EAST SIDE
DITCH
BAKER
Etna
River
Salt
WYOMING
IDAHO
Miller
Newswander Canyon
Pat Canyon
Creek
6500
6000
7000
8905
SAWMILL
Creek
Glenn Sch
5848
5706
5708
R 46 E
Creek

Unit No. 6	2,700 acres
Jackknife Creek	460 infested trees

Roads are available through this area. The infection seems to be confined to the small areas shown on the map. In this case the estimate is believed to be too high.

As to treatment, a thorough scouting late in June or early July should pick up most of the infested trees.



CARIBOU NAT'L. FOR.
DIAMOND FLATS
Unit No. 7

Scale:
1 mile
:..........:

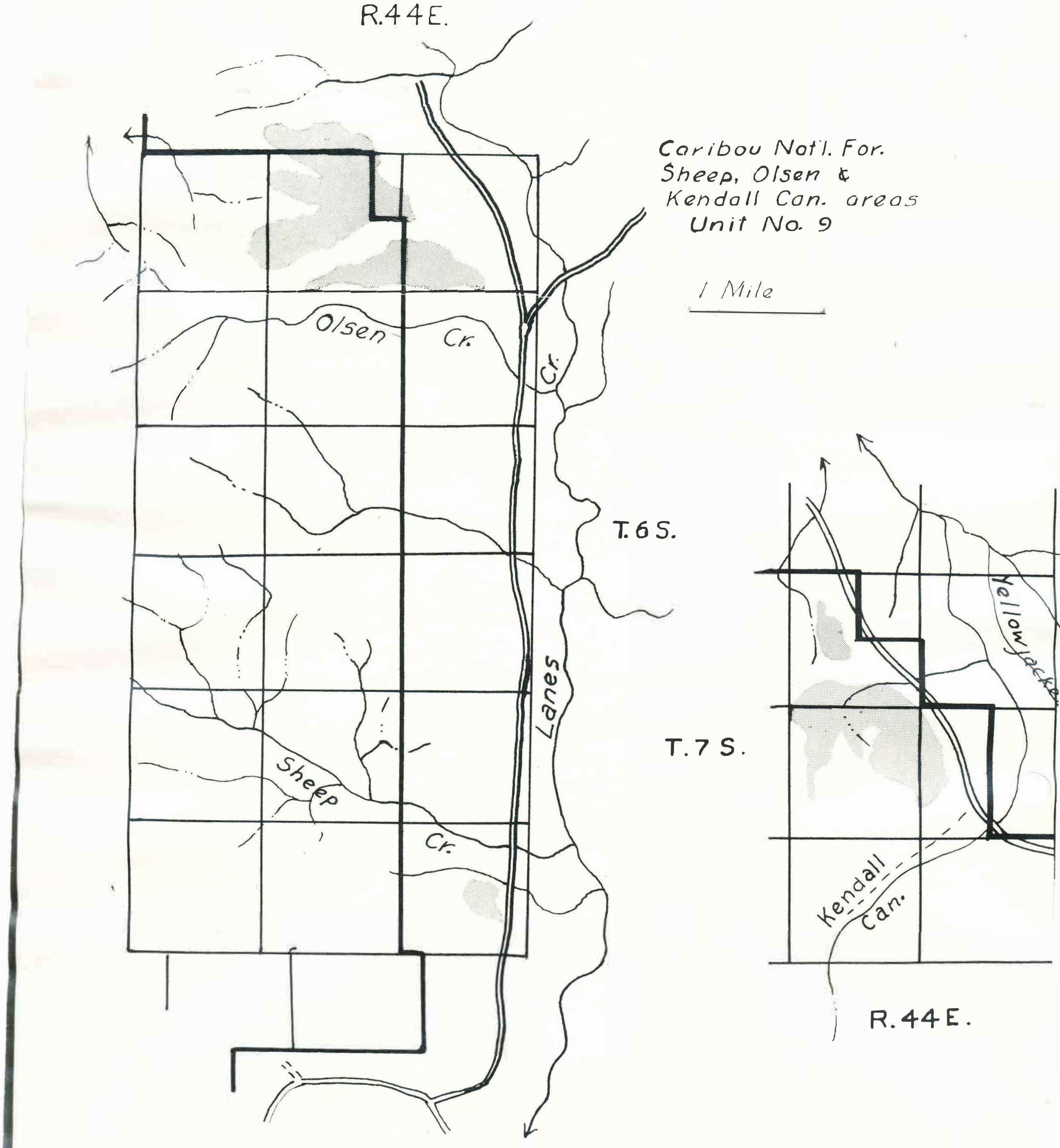
T.6 S.
R.45 E.
R A N G
C A R
N A T I O N A L
North Fork
Stump
LANDERS
Creek
Bechler Creek
Boulder
Creek
Creek
Timothy
Creek
Horse
CUTOFF
BM 7649
BM 6414
△8600
8602
8318
8068
8276
8258
8129
7761
7708
7436
7605
7408
7383
7736
7713
7361
7107
6687
7154
7058
7464
7367
6988
6466
8256
8237
8065
7690
7796
7610
6512
7073
7050
6862
6900
7662
7852
8128
8100
8212
8202
7528
7261

Unit No. 7	4,000 acres
Diamond Flats	1,880 infested trees

The information obtained relative to this area is rather meager. Aerial observation and sample strip data were the source of the host type indicated on the map. The infestation seems to be in the initial stage and occurs in groups pretty well scattered throughout the area. The terrain is rough along the ridge to the southwest but for the most part the type is fairly level. Very little other information is available regarding this area. The Lander Trail road is usable from Williamsburg but is understood to be closed farther down Stump Creek.

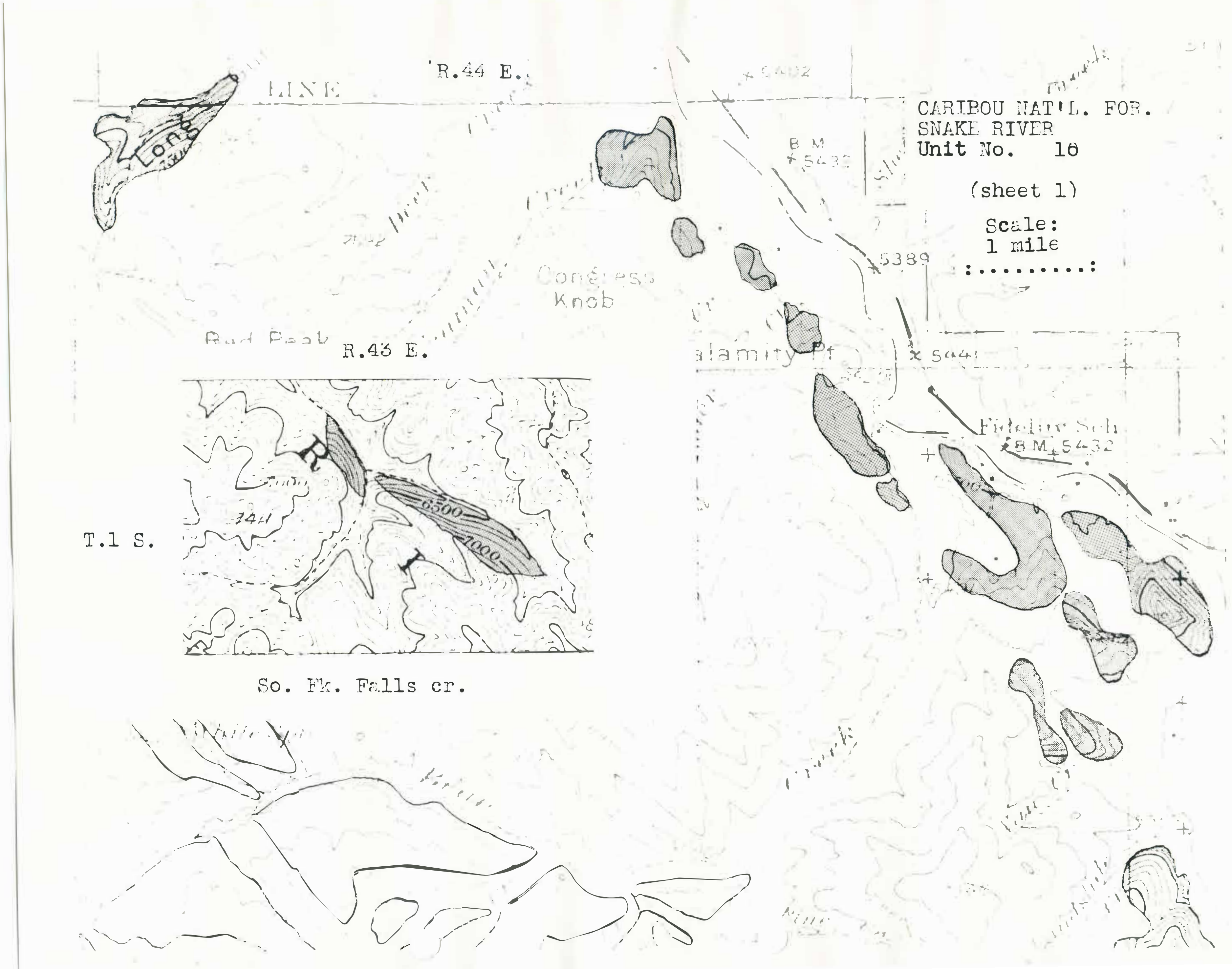
Unit No. 8	400 acres
Deer Creek - Diamond Ridge	300 infested trees

Located along a ridge at the head of Deer Creek this area is estimated at 160 to 400 acres. It was located by the District Ranger and examined by two members of the survey crew. The exact location is not recorded. It is suggested that further scouting of the area be done before control measures are undertaken.


R.44E.
Caribou Nat'l. For.
Sheep, Olsen &
Kendall Can. areas
Unit No. 9
1 Mile
Olsen Cr.
Lanes Cr.
T.6S.
T.7S.
Sheep Cr.
Yellowjacket
Kendall Can.
R.44E.

Unit No. 9	1,100 acres
Sheep, Olson & Kendall Canyon	200 infested trees

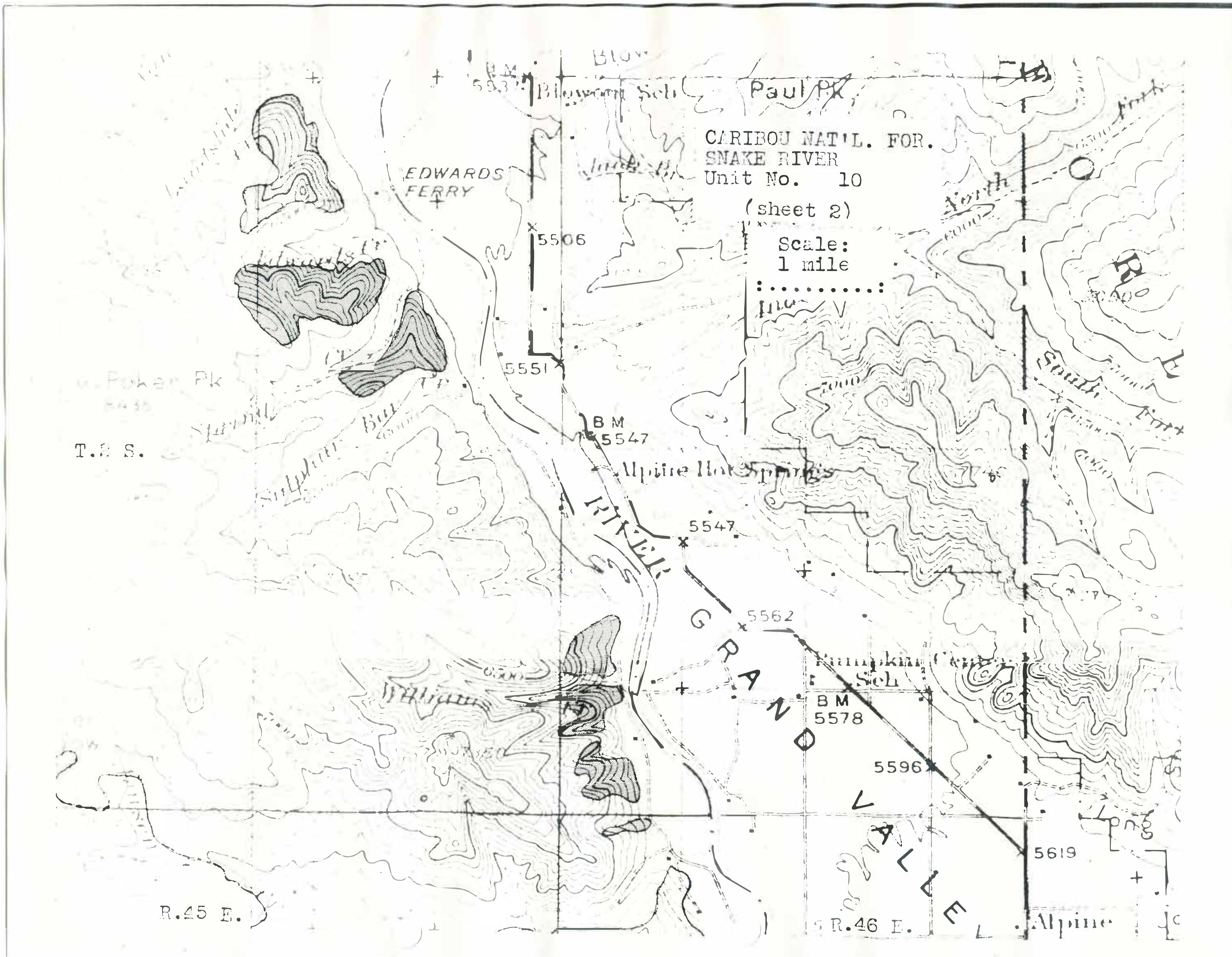
These three areas of infestation are believed to be local in character. The infested trees are in small, widely scattered groups. A small mobile crew with hand pumps and pack stock should be best suited for treatment of the area.


R.44 E.
LINE
Long
Congress
Knob
Red Peak
R.45 E.
Calamity Pt
x 5402
B M
x 5432
x 5389
x 5441
Fidelity Sch
B M 5432
6500
7000
T.1 S.
So. Fk. Falls cr.

CARIBOU NAT'L. FOR.
SNAKE RIVER
Unit No. 16

(sheet 1)

Scale:
1 mile
:..........:


CARIBOU NAT'L. FOR.
SNAKE RIVER
Unit No. 10
(sheet 2)

Scale:
1 mile
:..........:

Paul Pk
Blowout Sch
EDWARDS FERRY
Edwards Cr
5506
5551
B M 5547
Alpine Hot Springs
RIVER
5547
5562
GRAND VALLEY
Pumpkin Center Sch
B M 5578
5596
5619
Williams
Poker Pk
Sulphur
North Fork
South Fork
Long
Alpine
T.2 S.
R.45 E.
R.46 E.
7000
6000

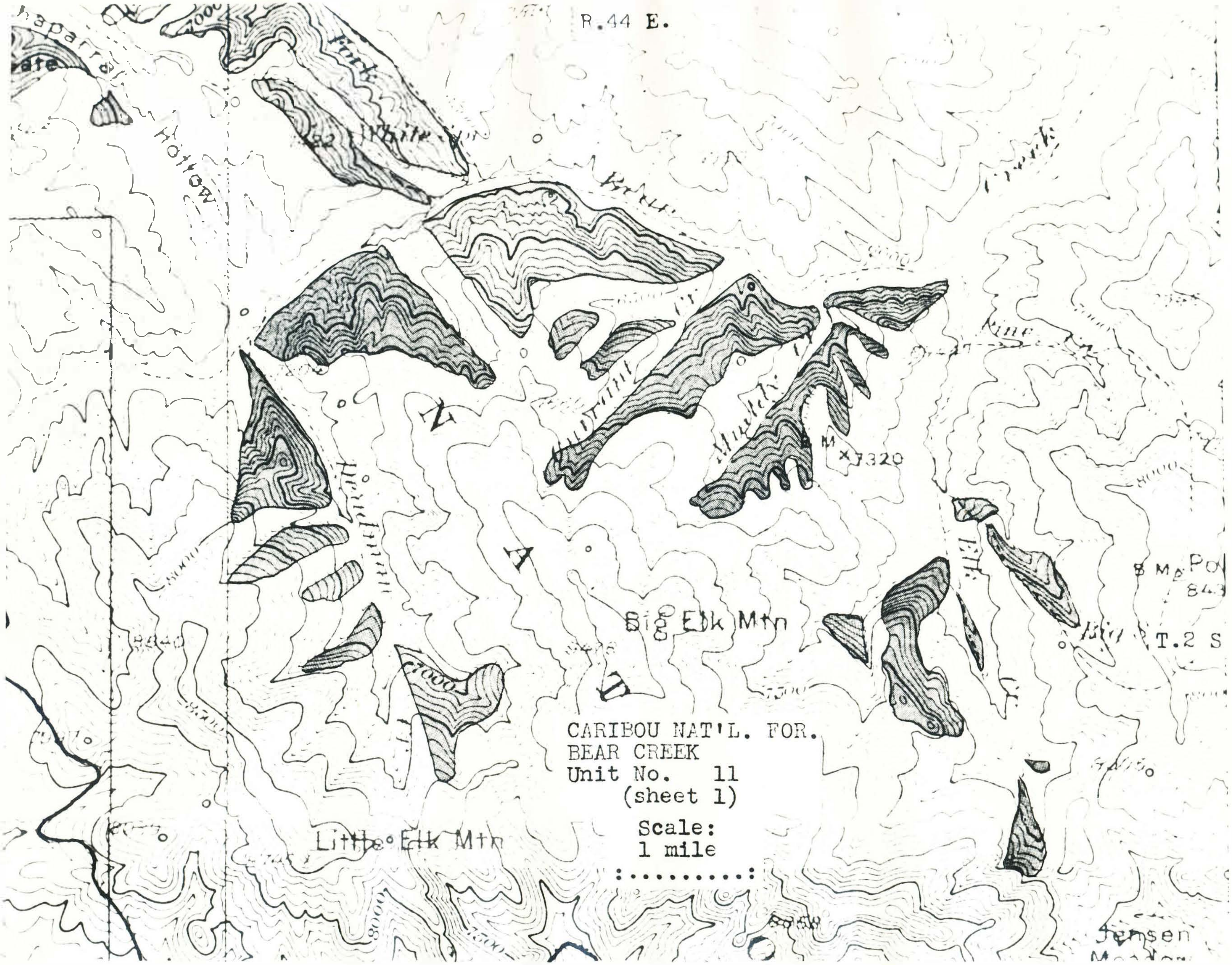
Unit No. 10 3,000 acres

Snake River 810 infested trees

Included in this area are all of the spots treated during the 1948 project and a few additional areas in Landslide, Edwards, Spring and Williams Creeks. While the acreage is not large or the infested trees many, this area is very difficult to treat. It is very steep and brushy. Spotting will be difficult and should be estimated at 60% more man-days than other, more moderate areas. On the basis of the work last spring, 350 man-days will be needed to do the work - most of which will be spotting.

Most of the timber patches are adjacent to the River Road but are steep pack stock chances. Hand pumps will be the most useful, and spotting should be done before treating to lessen travel time of treating equipment. A camp of two spotting crews making good accurate maps of infested trees to be followed later by a small treating crew would perhaps be the best organization.

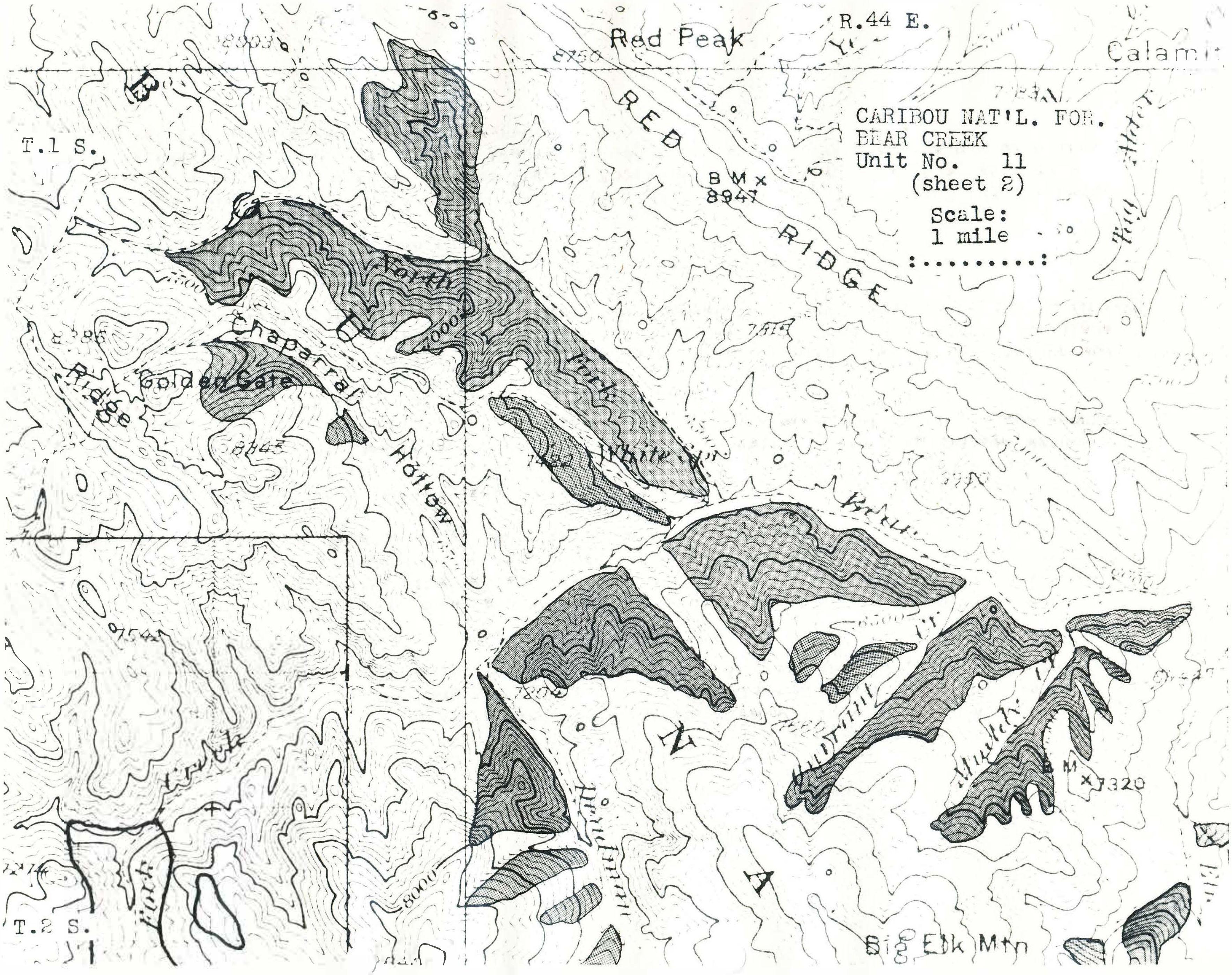
The host type maps covering the area in two sheets are fairly accurate. Sheet No. 2 lies southeast and overlaps No. 1.



R.44 E.
T.2 S
Hollow
Fork
White
Creek
N
A
U
Big Elk Mtn
Little Elk Mtn
×7320
Jensen
7000

CARIBOU NAT'L. FOR.
BEAR CREEK
Unit No. 11
(sheet 1)

Scale:
1 mile
:..........:



CARIBOU NAT'L. FOR.
BEAR CREEK
Unit No. 11
(sheet 2)

Scale:
1 mile

R.44 E.
Red Peak
Calamit
RED RIDGE
B M × 8947
T.1 S.
T.2 S.
B
U
N
A
North Fork
White
Chaparral
Golden Gate
Ridge
Hollow
Big Elk Mtn
B M × 7320
8750
8903
7000
8000
7482

Unit No. 11 7,500 acres

Bear Creek 7,000 infested trees

This area is thought to be the "hottest" on the forest. The type is mostly on steep northern slopes and is often mixed with D. F. and alpine fir along the ridges. The infestation runs from very light to very heavy. The more heavily infested areas are along the Bear Creek face above Muddy Creek. Large groups are scattered through this area. Elk Creek is known to be lightly infested.

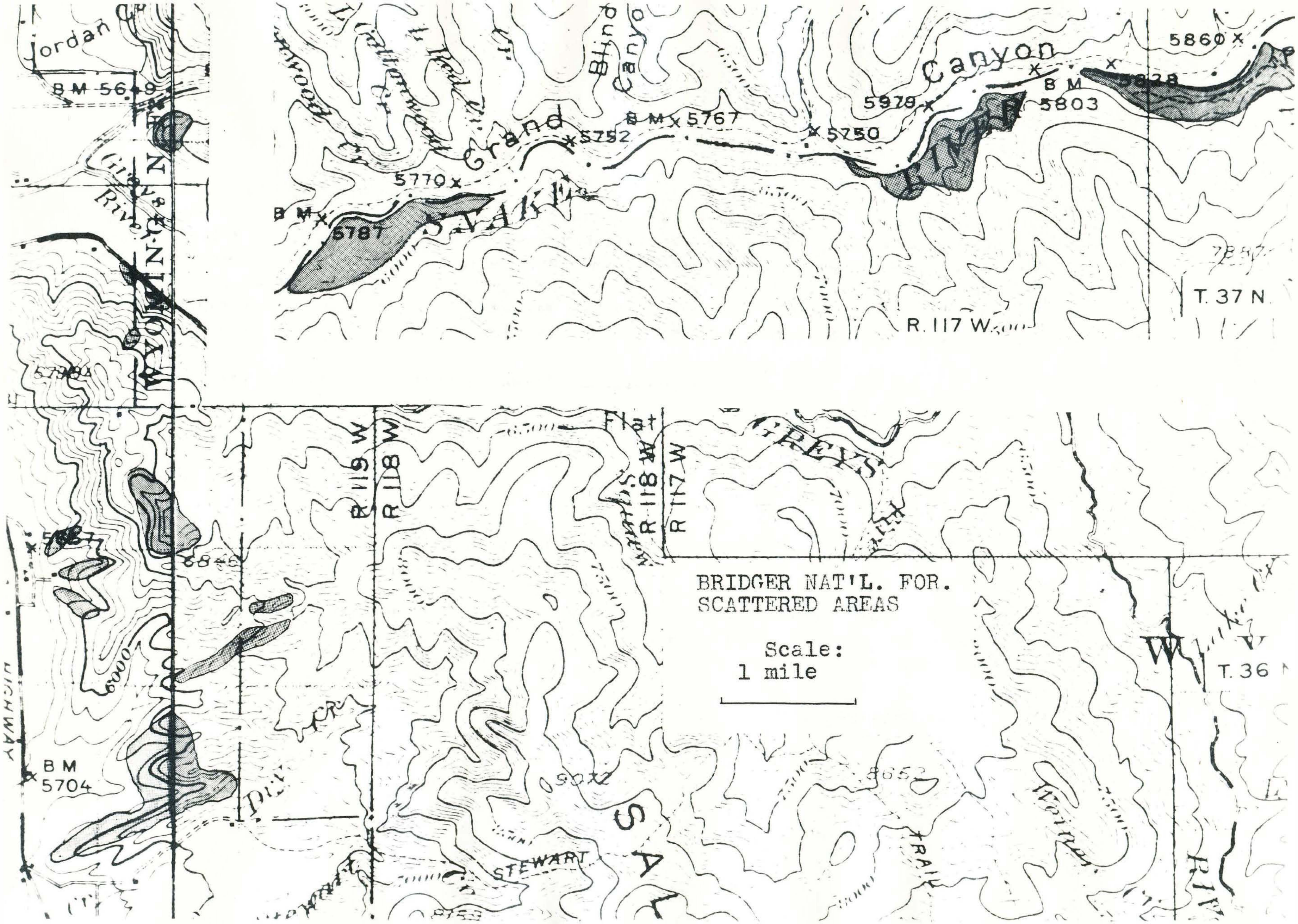
The host type maps presented were drawn from observation points on Red Ridge and are only approximate. The estimate was made from observation, examination, and a very limited acreage of sample strip. The accuracy of the estimated number of infested trees is therefore questionable. It is the best estimate that can be made under the circumstances.

A road having numerous creek crossings runs to the mouth of Elk Creek and up Elk Creek for about two miles. This road is difficult to travel with a pickup in dry weather. From the mouth of Elk Creek up Bear Creek to Deadman Creek a road could be easily built. Wide open bottoms extend most of the way. Jeep roads could be built up some of the side drainages but further study should be made before construction is undertaken.

From the above estimate, two camps are indicated. It will, in all probability, be late before work can be undertaken in this area because of high water in Bear Creek. The camps should be put along Bear Creek. Tentative locations would be, the mouth of Current Creek and the mouth of the North Fork.

Both power pumps and hand pumps would be useful in this area, although the steepness of the ground would indicate more use for hand pumps.

It is estimated that 1,150 man-days will be required to do the control work. This is on the basis of production in the North Pine unit of the Targhee forest of last spring. The Pine Creek unit was used because there is a similarity of topography and infestation. The man-days may be broken down into 445 for spotting and 700 for treating.


BRIDGER NAT'L. FOR.
SCATTERED AREAS

Scale:
1 mile

Grand Canyon
SNAKE RIVER
Blind Canyon
Cottonwood Cr.
L Red Cr.
Jordan Cr.
Greys River
GREYS
WYOMING
SALT
STEWART
TRAIL
Flat
Squaw
HIGHWAY
5860
5828
B M 5803
5979
5750
B M 5767
5752
5770
B M 5787
B M 5649
B M 5704
7000
7500
8000
T. 37 N
T. 36 N
R. 117 W.
R. 119 W
R. 118 W
R. 117 W

BRIDGER NATIONAL FOREST

Unit No. 12	6,400 acres
Greys River and Little Greys River	128 infested trees

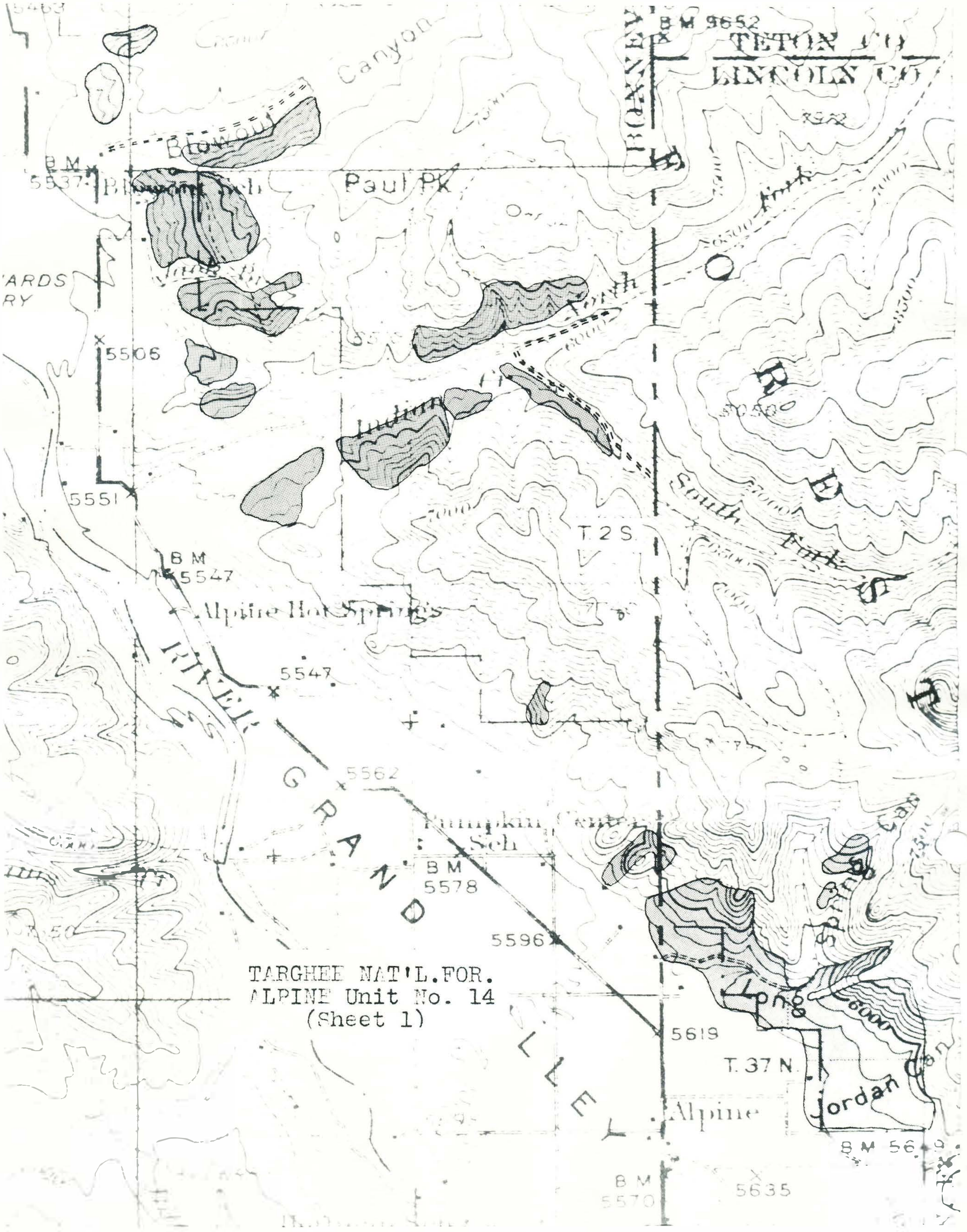
Included in this unit are all of the controlled areas plus a small additional area in Little Greys River. Extensive examinations were made up Greys River as far as the Meadow Creek R. S. and up Little Greys River to McCain Meadows. On these examinations, only a very few infested trees were found. No map is given for the Greys River unit.

No control measures are recommended in the Greys River unit.

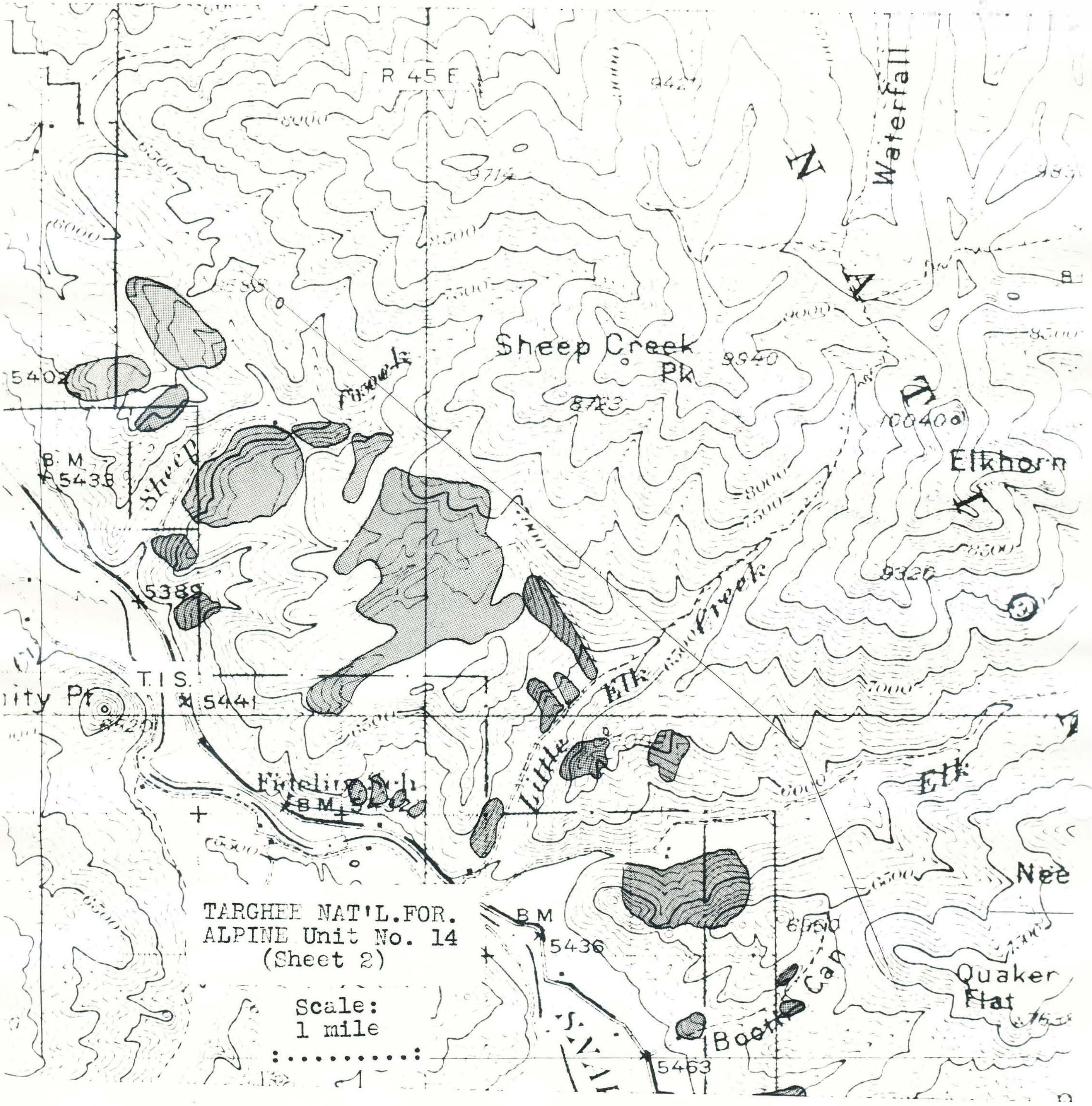
Unit No. 13	620 acres
Moose Creek	18 infested trees

Controlled last spring. No further control recommended.

Unit 13A. Several small, widely scattered areas along the southern side of the Snake River and between Greys River and the Salt River are shown on the map. These areas were not surveyed. From observation and examinations it is estimated that 500 infested trees are on the 400 acres that these small areas total. Control measures are recommended for these areas. They could perhaps be treated by a small combination spotting-treating crew. Because of the scattered nature of the patches and of the difficulty of crossing the Snake River, it is estimated that 150 man-days will be required for this work.


Canyon
Blowout
BM 5537
Blowout Sch
Paul Pk
BM 9652
TETON CO
LINCOLN CO
BONNEV
North
Fork
South Fork
FOREST
5506
Indian Cr
5551
T. 2 S.
BM 5547
Alpine Hot Springs
RIVER
5547
GRAND
5562
Pumpkin Center Sch
BM 5578
5596
VALLEY
5619
Spring Can
Long
T. 37 N.
Jordan Can
Alpine
BM 5570
5635

TARGHEE NAT'L.FOR.
ALPINE Unit No. 14
(Sheet 1)



TARGHEE NAT'L.FOR.
ALPINE Unit No. 14
(Sheet 2)

Scale:
1 mile

R 45 E
Waterfall
9714
9940
Sheep Creek Pk
8783
10040
Elkhorn
9320
Sheep
Creek
5402
B M
5438
5389
T 1 S.
5441
Little Elk Creek
Elk
Nee
Quaker Flat
B M
5436
6960
Booth Can
5463
Fiteling Sch
B M
8000
8500
7500
9000
7000
6500
6000

TARGHEE NATIONAL FOREST

Unit No. 14	4,400 acres
Alpine	1,056 infested trees

This unit includes many small patches along the Snake River between Alpine, Wyoming and Swan Valley, Idaho. These areas are quite accessible to the highway. The thinly scattered infestation will be largely a spotting job. All necessary roads are already available. The camp location at Alpine, although at the extreme lower end of the area, is the best site because many of the facilities for a camp are there. Equipment for control should be the light hand pumps.

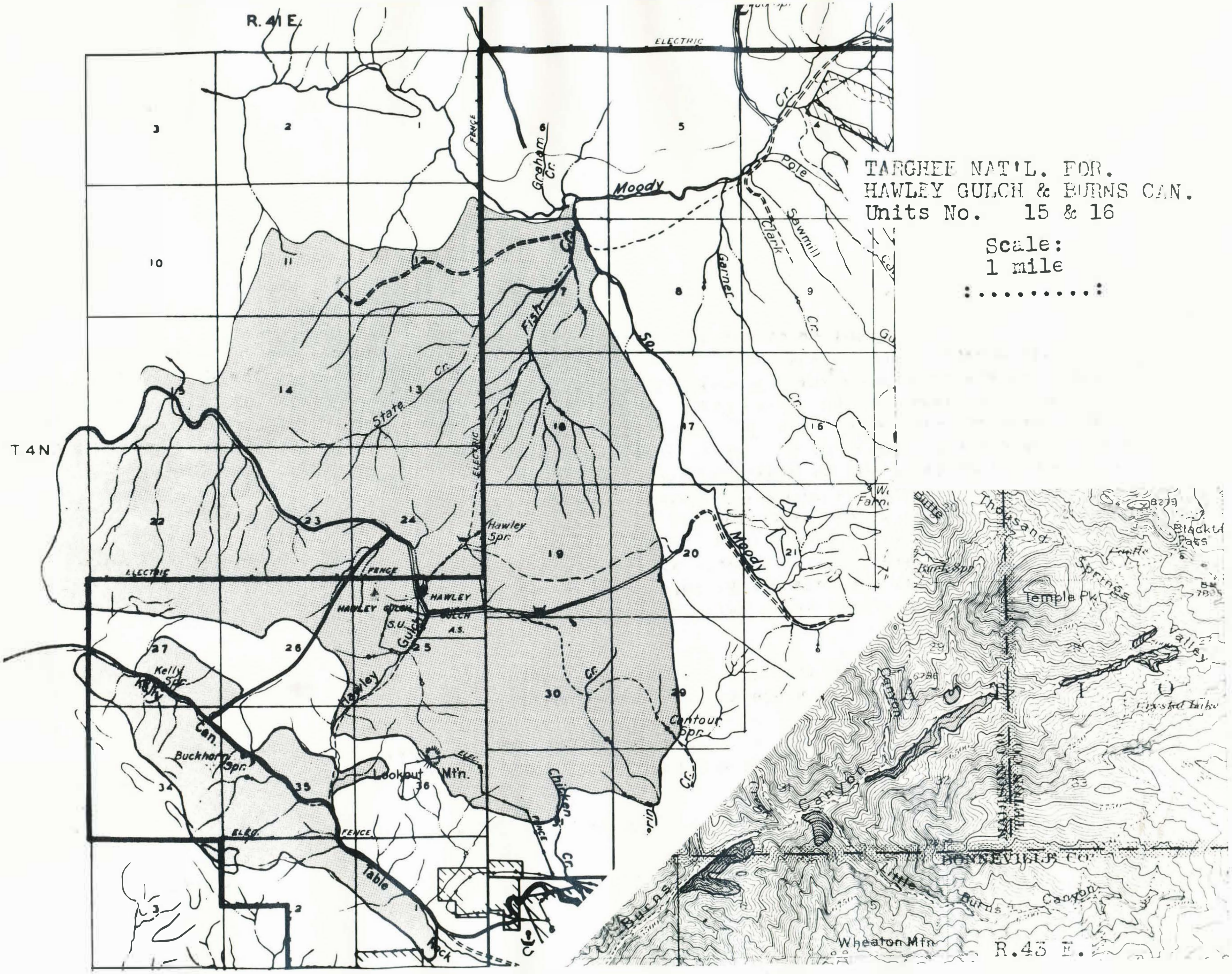
Some of this area is brushy and steep. Spotting prior to treating would seem to be advisable rather than to try a combination crew.

Because of the lightness of the infestation, it is estimated that 380 man-days will be necessary for the control operations. This may be divided into 230 man-days spotting and 150 man-days treating -- 3 trees per project man-day.

The type maps showing the area are in two sheets; the second sheet is a continuation of No. 1 and extends to the northwest. Type shown on these maps are only approximate.

TARGHEE NAT'L. FOR.
HAWLEY GULCH & BURNS CAN.
Units No. 15 & 16

Scale:
1 mile
:..........:

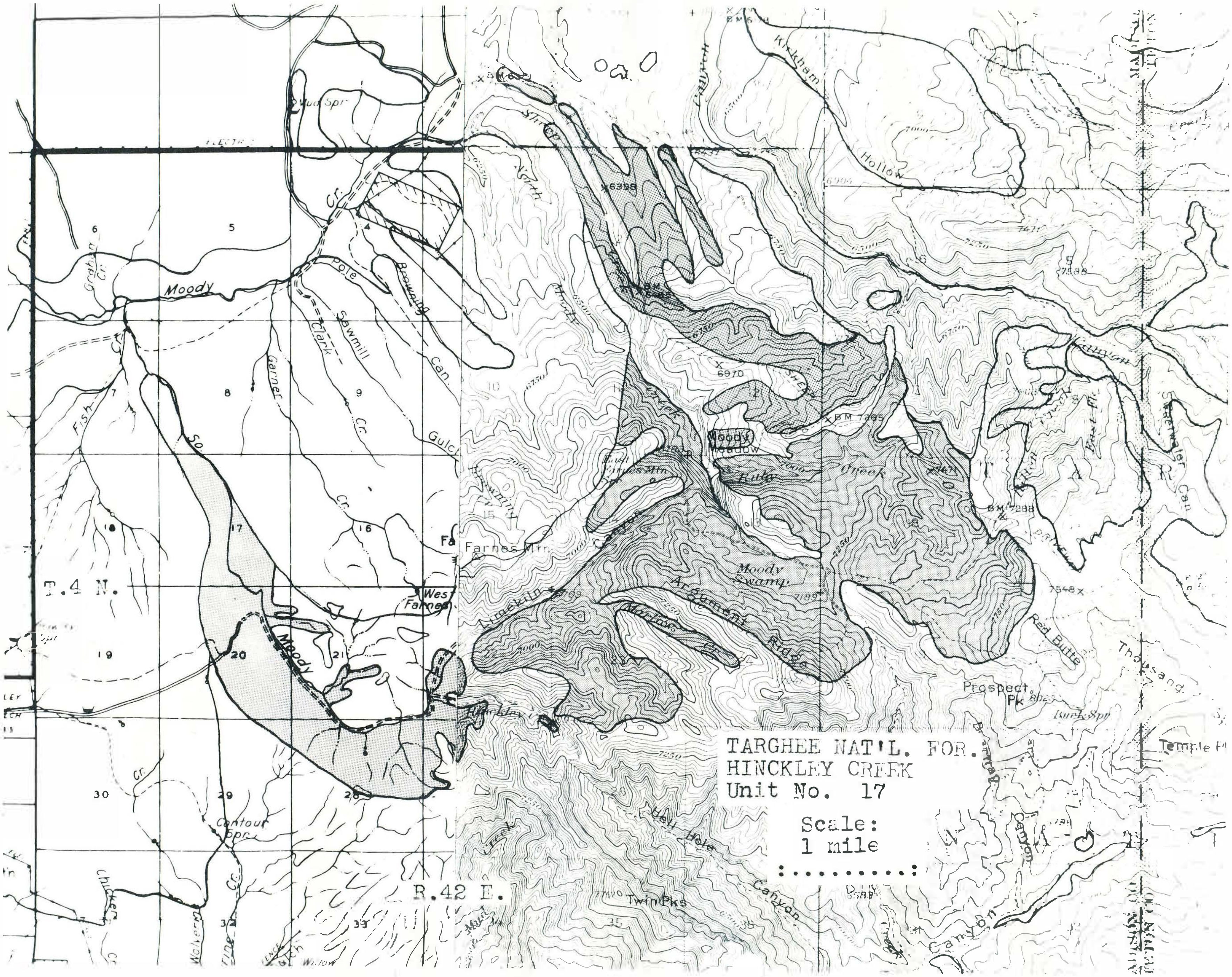


R. 41 E.
T 4N
ELECTRIC
FENCE
Graham Cr.
Moody
Pole
Sawmill
Clark
Garner
Cr.
Gu
State Cr.
Fish
So.
Hawley Spr.
Moody
ELECTRIC
FENCE
HAWLEY GULCH S.U.
HAWLEY GULCH A.S.
Hawley Gulch
Kelly Spr.
Kelly Can.
Buckhorn Spr.
Lookout Mt'n.
ELEC.
ELEC.
FENCE
Table Rock
Chicken Cr.
Cr.
Contour Spr.
Cr.
Farm
Butte
Thousand Springs Valley
Temple Pk.
Blacktail Pass
Canyon
Canyon
Burns
Little Burns Canyon
BONNEVILLE CO.
Crystal Lake
Wheaton Mtn.
R. 43 E.
3
2
1
6
5
4
10
11
12
7
8
9
15
14
13
18
17
16
22
23
24
19
20
21
27
26
25
30
29
34
35
36
2
1
28
29
32
33
5

Unit No. 15	Burns Canyon	600 acres	78 infested trees
Unit No. 16	Hawley Gulch	10,500 acres	2,415 infested trees

The Burns Canyon area was treated during the 1948 control job by a mobile crew with a small camp outfit and pack stock. Following the same procedure again but a little more thoroughly would be advisable. This area is worked out of the Hawley Gulch camp. If the work is delayed until late June or early July, it is felt that most of the infested trees could be spotted or mapped from observation points along the north side of the canyon. Nearly all of the infested type is along the south side on very steep ground.

The rolling topography and pine stands of the Hawley Gulch area needs little description. Control measures for the past two years have not been as successful in reducing the infestation as in other areas. The type seems to be highly susceptible to insect attacks. It is felt that spotting has not been too successful in locating all the infested trees in this unit because of the large numbers of "blind attacks" peculiar to the area. These attacks are most numerous in heavily stocked stands of small diameter trees. In some, nothing more than ventilation holes are evident that the tree has been attacked. It is suggested that very special emphasis be placed on the spotting and constant check of the spotting crews be made. It may be necessary to shorten the width of the strip covered per spotter in order to clean this area up. As in most other units, treating the infested trees will be a small job in comparison to the spotting. Light hand pumps would be most suitable for the work. With less than half of the infestation of last year, the spring control can be expected to be less efficient in number of trees treated per man-day. The infestation is evenly distributed over the area. It is estimated that 950 man-days will be needed to do the job.

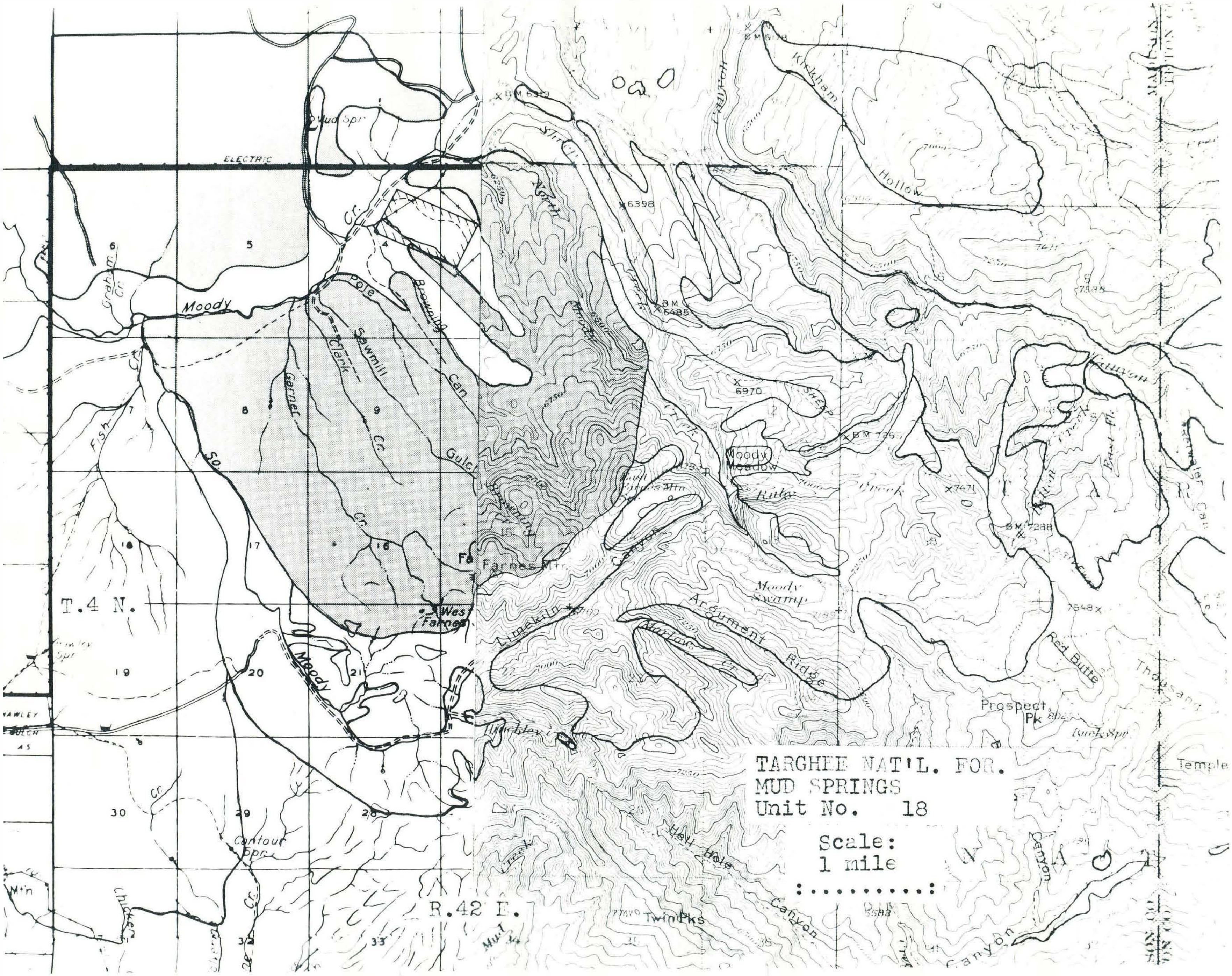

Moody
Moody Cr.
Pole
Sawmill
Clark
Garner
Browning
Can.
Gulch
Fish
So.
Moody
Grabing Cr.
Farnes Mtn.
West Farnes
East Farnes Mtn.
Moody Meadow
Moody Swamp
Argument Ridge
Limekiln
Canyon
Hinckley
Hell Hole Canyon
Twin Pks
Red Butte
Thousand
Prospect Pk
Temple Pk
Kirkham Hollow
Canyon
Contour Spr.
T. 4 N.
R. 42 E.
X 6398
X 6970
BM 7265
BM 7288
7548 X
7588
6
5
4
7
8
9
10
15
16
17
18
19
20
21
29
30
33
34
35

TARGHEE NAT'L. FOR.
HINCKLEY CREEK
Unit No. 17

Scale:
1 mile
:..........:

Unit No. 17	5,550 acres
Hinkley Creek	1,166 infested trees

The Hinkley Creek area presents very much the same condition as on the Hawley Gulch unit. The infestation is distributed over the entire area and less than half as heavy as last year. Sufficient roads for control work are already available on these units. Camp sites are also available and well placed. Spotting will be the big job and should be well organized and frequently checked. On the basis of last years work plus an allowance for more scattered infestation, it is estimated that about 575 man-days will be needed to finish the work.



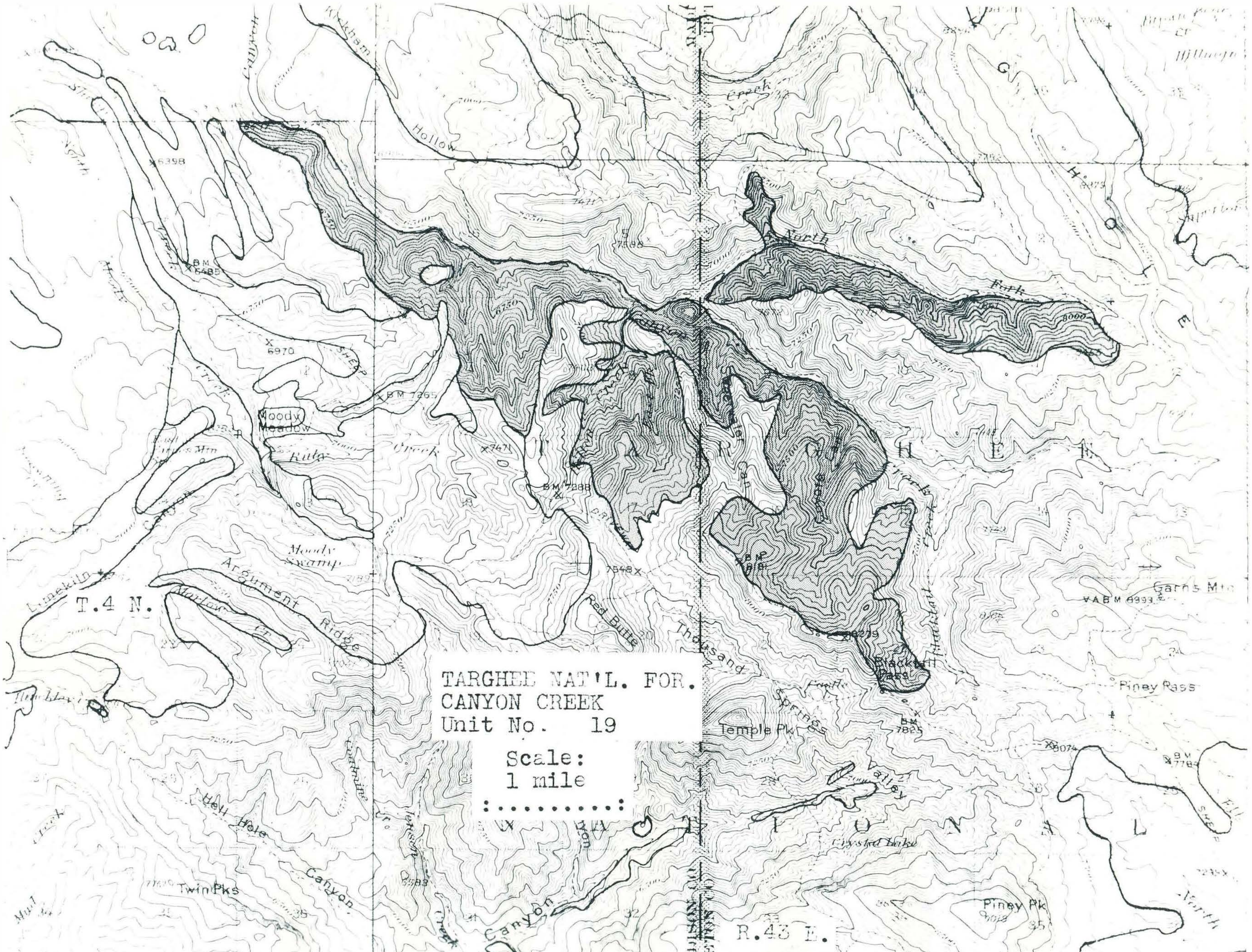
TARGHEE NAT'L. FOR.
MUD SPRINGS
Unit No. 18

Scale:
1 mile
:..........:

T.4 N.
R.42 E.
ELECTRIC
Mud Spr.
Moody
Graham Cr.
Fish Cr.
So. Fk.
Pole
Browning
Can.
Sawmill
Clark
Garner
Cr.
Gulc.
Farnes Mtn.
West Farnes
North
Moody
Kirkham
Hollow
Sheep
Creek
Moody Meadow
Ridge
Moody Swamp
Argument
Ridge
Limekiln
Canyon
Hell Hole
Canyon
Twin Pks
Red Butte
Prospect Pk
Thousand
Temple
BM 6485
6398
6970
BM 7288
7471
7548
Contour Spr.
Chicken
5
6
8
9
10
15
16
17
19
20
21
28
29
30
32
33

Unit No. 18	7,680 acres
Mud Springs	614 infested trees

No organized control camp is recommended for this area during the spring control project. It is planned to fly over the unit late in the season and try, by careful observation, to locate all the infested trees possible by this method. The trees could then be treated by the Hinkley Creek camp. As the present infestation is well distributed over the area, any attempt at "hot spotting" will be difficult.



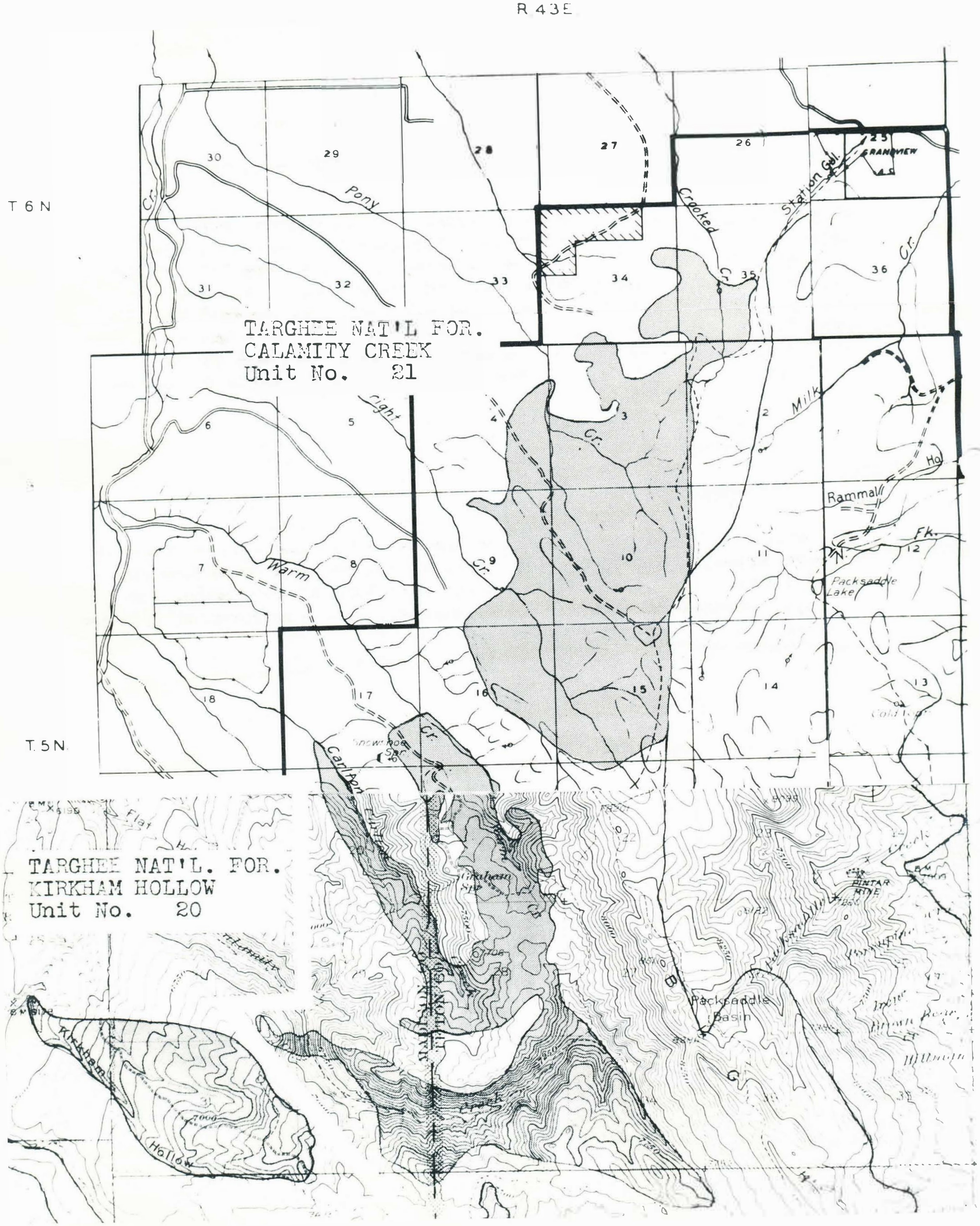
TARGHEE NAT'L. FOR.
CANYON CREEK
Unit No. 19

Scale:
1 mile
:..........:

T.4 N.
R.43 E.
Hollow
Moody Meadow
Moody Swamp
Argument Ridge
Red Butte
Thousand Springs
Temple Pk
Blacktail Pass
Piney Pass
Garns Mtn
Piney Pk
Crystal Lake
Twin Pks
Bell Hole Canyon
Canyon
North Fork
Limekiln
MADISON CO.
TETON CO.

Unit No. 19	5,064 acres
Canyon Creek	354 infested trees

The same treatment of this area as for the Mud Springs unit is proposed. The infestation seems well distributed, however, and hot spotting will be difficult.


TARGHEE NAT'L FOR.
CALAMITY CREEK
Unit No. 21

TARGHEE NAT'L. FOR.
KIRKHAM HOLLOW
Unit No. 20

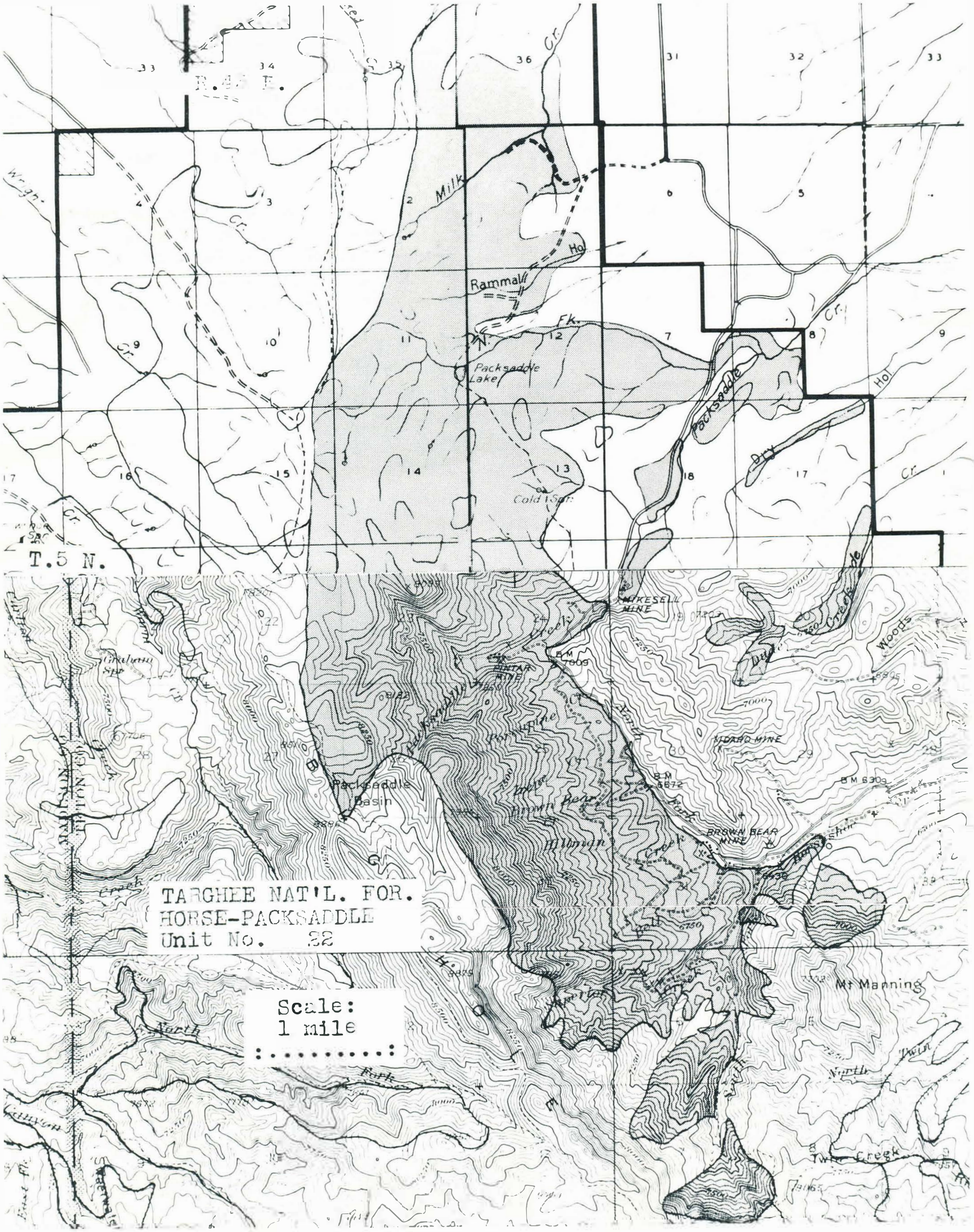
R 43E
T 6 N
T 5 N
30
29
28
27
26
25
GRANDVIEW
31
32
33
34
35
36
Pony
Cr.
Crooked
Cr.
Station Gul.
Cr.
6
5
4
3
2
Light
Cr.
Milk
Ho
Rammal
Fk.
N.
7
8
9
10
11
12
Warm
Cr.
Packsaddle Lake
18
17
16
15
14
13
Cold Spr.
Snowshoe Spr.
Carlton
Cr.
Flat
Graham Spr.
Kirkham
Hollow
Packsaddle Basin
PINTAR MINE
Porcupine
Brown Bear Cr.
Creek
B
C

Unit No. 20	1,096 acres
Kirkham Hollow	438 infested trees

This area lies on a plateau-like bench between Canyon Creek and Calamity Creek. It is more or less isolated by these drainages. Control work of last spring was undertaken in the area late in the season and was not very effective. The infestation is found in fairly sizable groups and should, by all means, be cleaned up. The area lends itself well to control operations. A road runs practically through the center. It is estimated that 60 man-days for spotting and 40 man-days for treating would about complete the work.

Unit No. 21	3,592 acres
Calamity Creek	no infestation

In conjunction with the aerial reconnaissance of the Canyon Creek and Mud Springs areas, a search of the Calamity will be made to locate any small spots of infestation that might have been missed during the survey. Indications are, however, that the area has remained uninfested despite the outbreak in adjacent areas to the south.


R.45 E.
T.5 N.
Milk
Rammal
Hol.
Fk.
Packsaddle Lake
Packsaddle
Dry
Cr.
Cold Spr.
MIKESELL MINE
PINTAR MINE
IDAHO MINE
BROWN BEAR MINE
Porcupine
Brown Bear
Hillman
Creek
Packsaddle Basin
Graham Spr.
MADISON CO.
TETON CO.
North
Fork
Mt Manning
Twin Creek
Woods
BM 7009
BM 6672
BM 6309

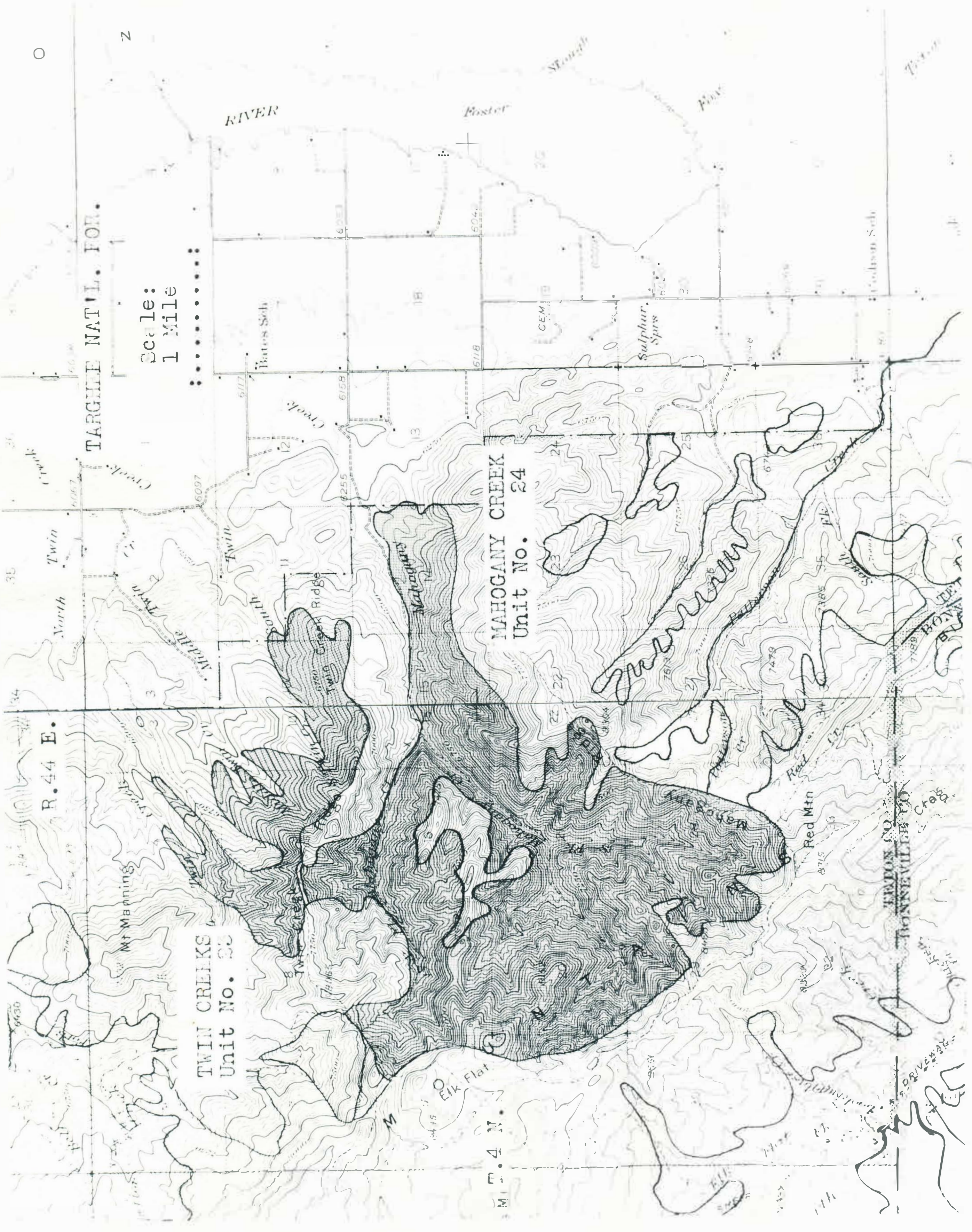
TARGHEE NAT'L. FOR.
HORSE-PACKSADDLE
Unit No. 22

Scale:
1 mile

Unit No. 22 9,769 acres

Horseshoe--Packsaddle 195 infested trees

No control is recommended for this area other than an aerial scouting and ground scouting in the vicinity of Packsaddle Lake. A small concentration of infested trees were treated near the lake during 1947. This area should be examined carefully. Much of the type in the northern extension of this unit has been cut over and is thinly stocked.

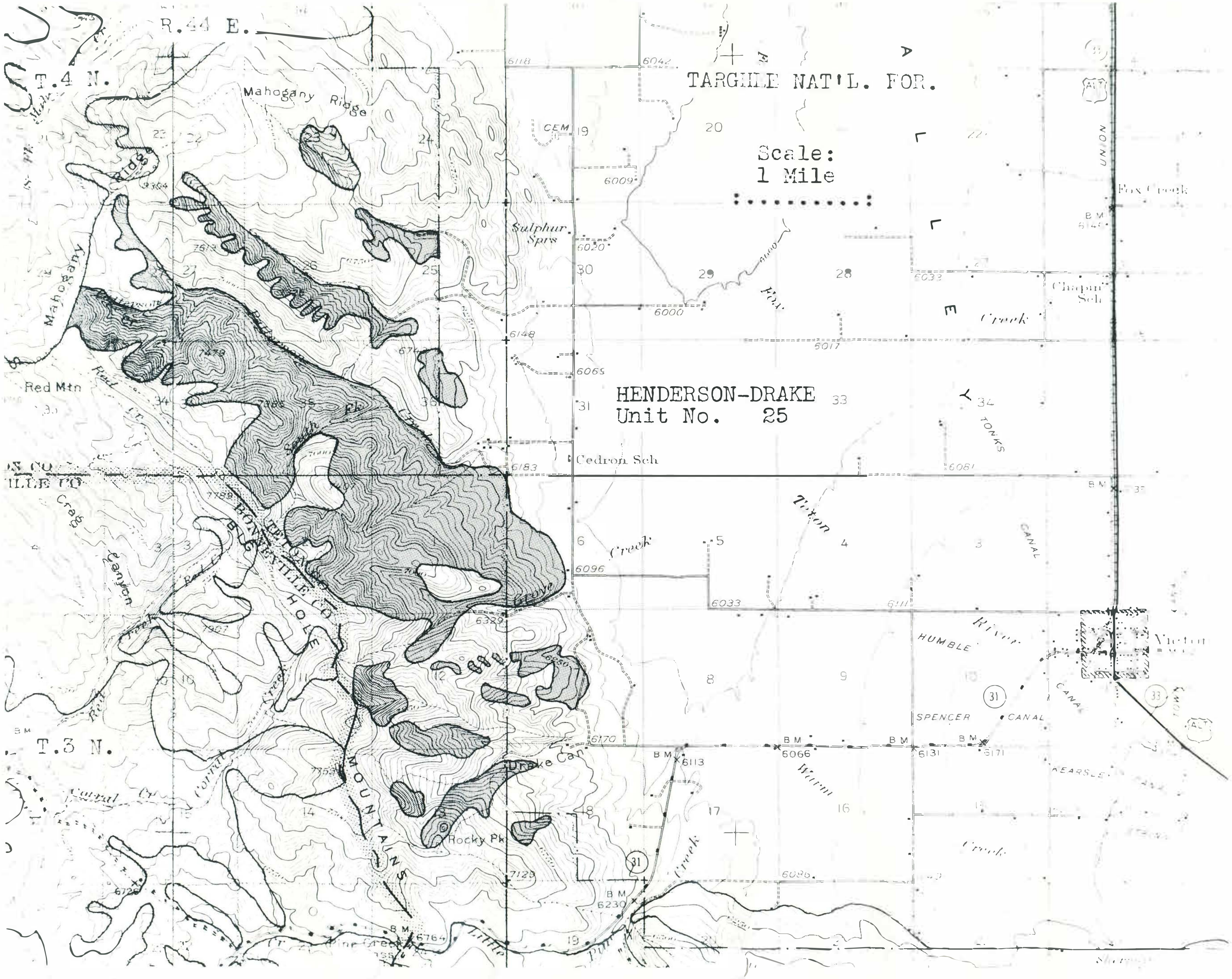

N
TARGHEE NAT'L. FOR.
Scale:
1 Mile
R. 44 E.
T. 4 N.
TWIN CREEKS
Unit No. 33
MAHOGANY CREEK
Unit No. 24
RIVER
Foster
Slough
Bates Sch
Sulphur Sprs
CEM
Mt Manning
North Twin
Middle Twin
South Twin
Twin Creek Ridge
Mahogany
Red Mtn
Red Cr
Elk Flat
TETON CO.
BONNEVILLE CO.

Unit No. 23	942 acres
Twin Creeks	132 infested trees

A very heavy infestation was treated on this area in 1948. Control measures are recommended as a clean up and will be almost entirely a spotting job. Between 60 and 70 man-days are estimated for doing the work.

Unit No. 24	5,430 acres
Mahogany Creek	488 infested trees

Control measures are recommended for the lower portion of this drainage where the infestation will run about .6 infested trees per acre. Spotting should be continued up the drainage until only an occasional infested tree is found. Further scouting of the unit from ridgetops should be done to pickup any spots of infestation. The area is too rough to permit effective aerial scouting. It is difficult to estimate the number of man-days required for the above work but it is thought that about 1,000 acres covered would be sufficient, requiring from 50 to 75 man-days.



R.44 E.
T.4 N.
T.3 N.
Mahogany Ridge
Mahogany
Red Mtn
Sulphur Sprs
CEM
Cedron Sch
Fox Creek
Chapin Sch
Teton Creek
HUMBLE
SPENCER CANAL
Drake Can
Rocky Pk
BIG HOLE MOUNTAINS
BONNEVILLE CO
TETON CO
Victor
Warm Creek
Canyon
Corral Cr
Pine Creek
UNION
VALLEY

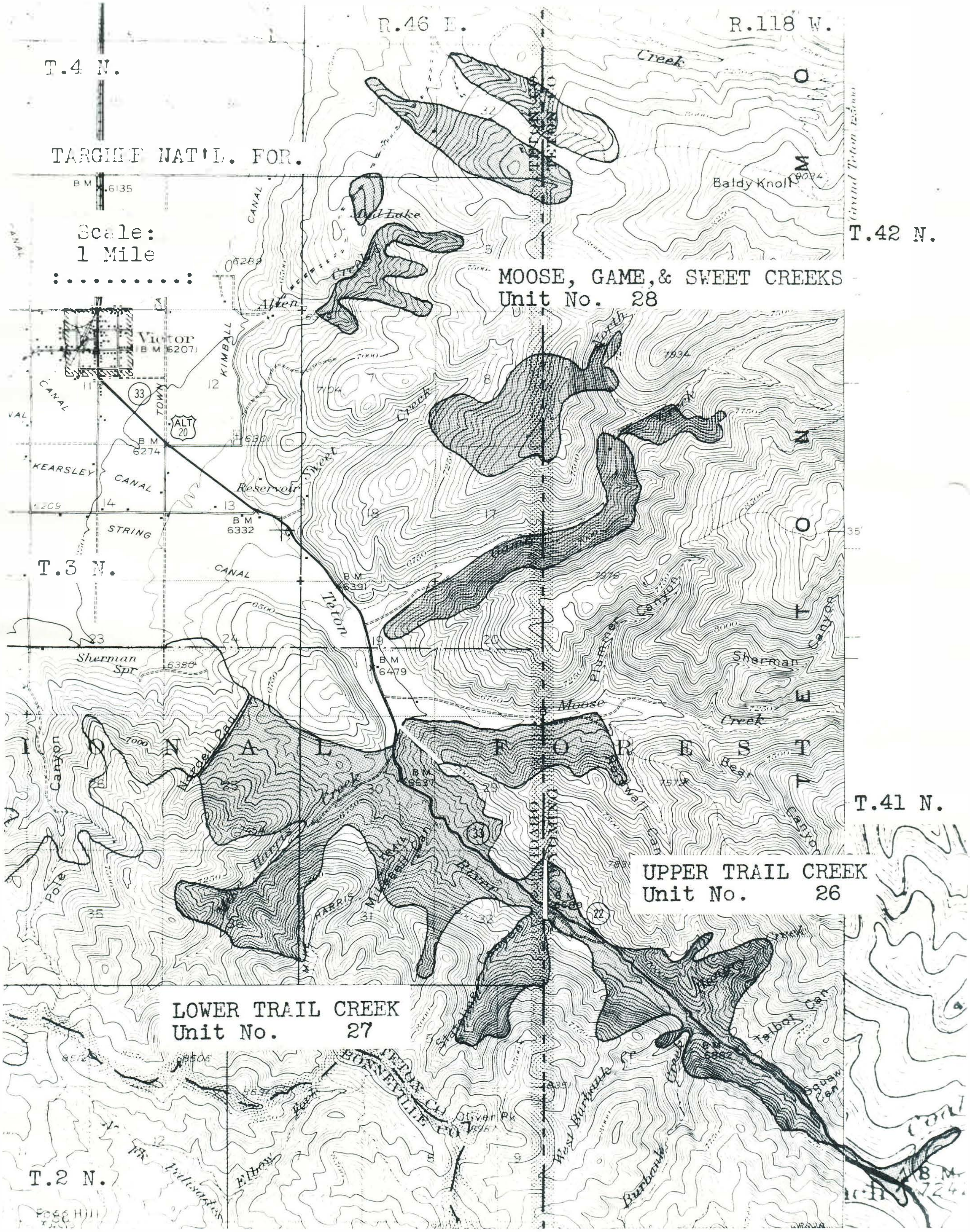
TARGHEE NAT'L. FOR.

Scale:
1 Mile

HENDERSON-DRAKE
Unit No. 25

Unit No. 25	3,100 acres
Henderson--Drake	500 infested trees

Although somewhat rough, this unit is accessible from roads. The area is brushy and could doubtless be worked best by spotting first and treating later. It is estimated that 260 man-days will be required to complete the work.


R.46 E.
R.118 W.
T.4 N.
TARGHEE NAT'L. FOR.
Scale:
1 Mile
T.42 N.
MOOSE, GAME, & SWEET CREEKS
Unit No. 28
Victor
Baldy Knoll
Reservoir
Teton
T.3 N.
Sherman Spr
Plummer Canyon
Moose Creek
Sherman Canyon
NATIONAL FOREST
T.41 N.
UPPER TRAIL CREEK
Unit No. 26
LOWER TRAIL CREEK
Unit No. 27
TETON CO.
BONNEVILLE CO.
IDAHO
WYOMING
West Burbank Cr
Talbot Can
Squaw Can
Oliver Pk
Elbow
Fogg Hill
T.2 N.

Unit No. 26 864 acres

Upper Trail Creek 103 infested trees

Most of the infestation in the Upper Trail Creek unit is in the Hungry Creek drainage. Scattered infestation is found in the stringers of type and on benches high up the slopes. The lodgepole pine runs into whitebark pine in the higher elevations and there is a sprinkling of infestation throughout these higher areas. It is difficult to determine how far control measures should be carried under these circumstances. The infestation in the WBP type is felt to be endemic. Control should probably be carried on in the LPP and all infested WBP treated where it occurs in the LPP type. A further check of the area will be made during the spring project to determine how far control measures should go. About 70 man-days will be sufficient to treat the Upper Trail Creek unit--50 man-days spotting and 20 man-days treating.

Unit No. 27 1,800 acres

Lower Trail Creek 54 infested trees

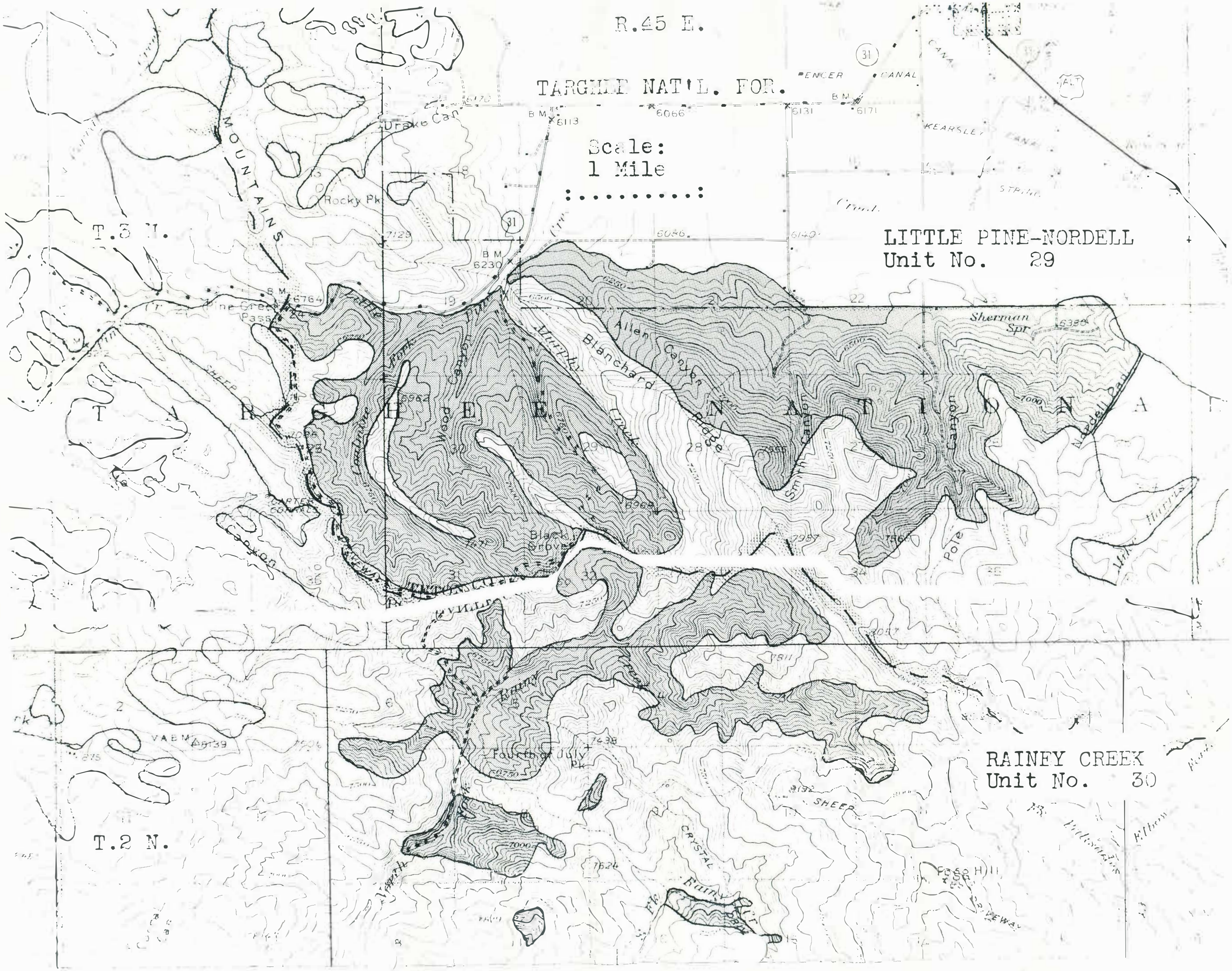
No control work is recommended for the Lower Trail Creek unit but the area should be looked over during July. Much of the area can be seen from the ridge north of Trail Creek. Using the faded foliage as a guide, any small groups of infested trees could be picked out and treated.

Unit No. 28 1,150 acres

Moose, Game, & Sweet Creeks 425 infested trees

The infestation in the scattered patches of timber making up this unit varies from light to heavy with some sizable groups. Although there are some roads, parts of the area are difficult to reach. Game creek, because of high water and rough, steep slopes will be especially hard to work in the spring. It would be well to allow a liberal man-day figure for treating this area -- 75 for spotting and 100 for treating.

The host type maps showing these three areas are fairly accurate for units 26 and 27; only approximate for unit 28.


R.45 E.
TARGHEE NAT'L. FOR.
Scale:
1 Mile
LITTLE PINE-NORDELL
Unit No. 29
RAINEY CREEK
Unit No. 30
T.3 N.
T.2 N.
MOUNTAINS
Drake Can
Rocky Pk
Pine Creek Pass
Wood Canyon
Murphy Creek
Blanchard Creek
Allen Canyon
Ridge
Smith Canyon
Canyon
Sherman Spr
Nordell Can
Pole
Black Grove
Fourth of July Pk
SHEEP
CRYSTAL
Rainey
Targhee National Forest

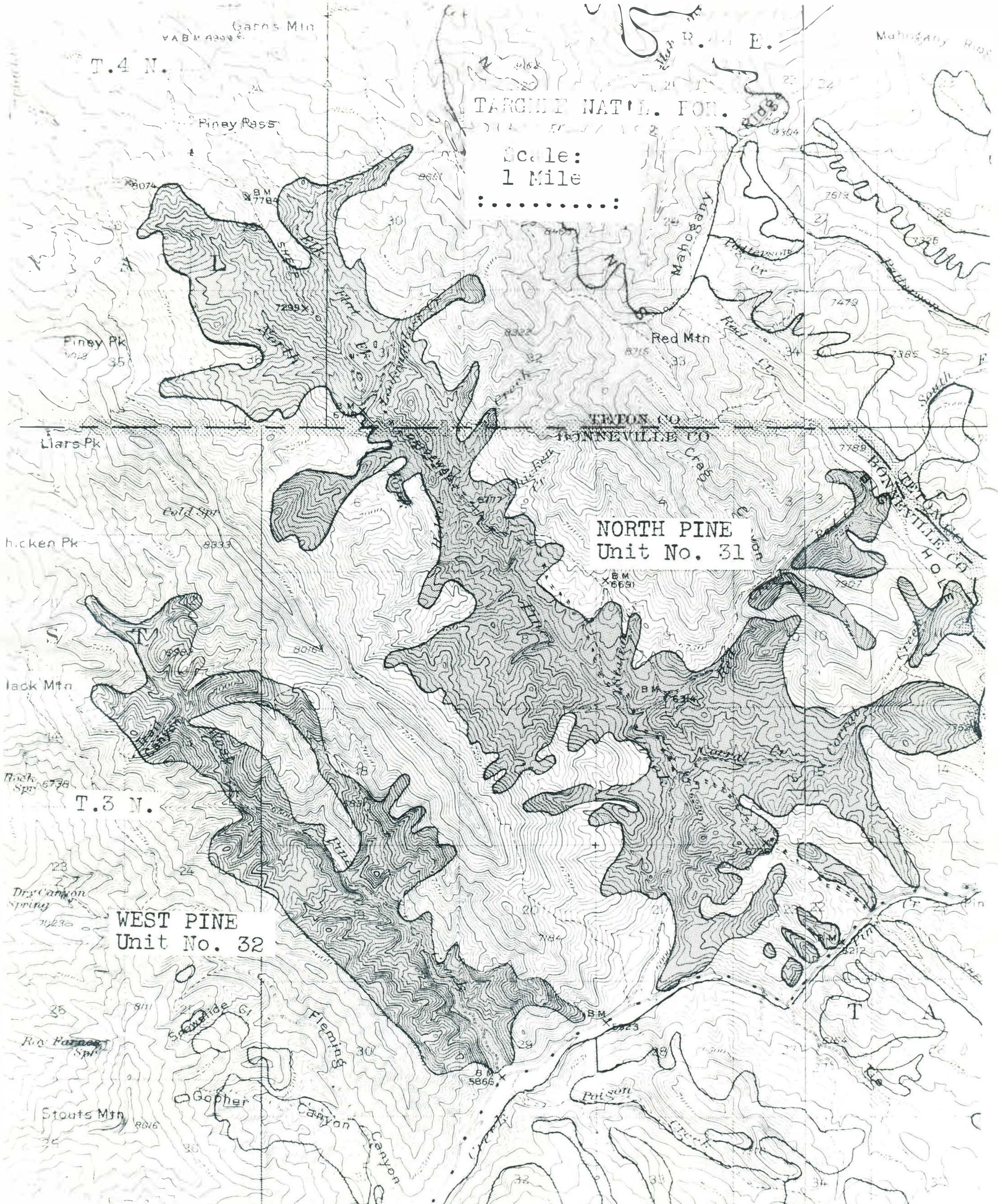
Unit No. 29	5,000 acres
Little Pine--Nordell	550 infested trees

Mostly a spotting job in this unit with a large acreage to cover and only a relatively few infested trees. The area is accessible by road, but brushy with steep topography. Much of the type along the north slopes is mixed with aspen. It is felt that 365 man-days will be required to treat and spot this unit.

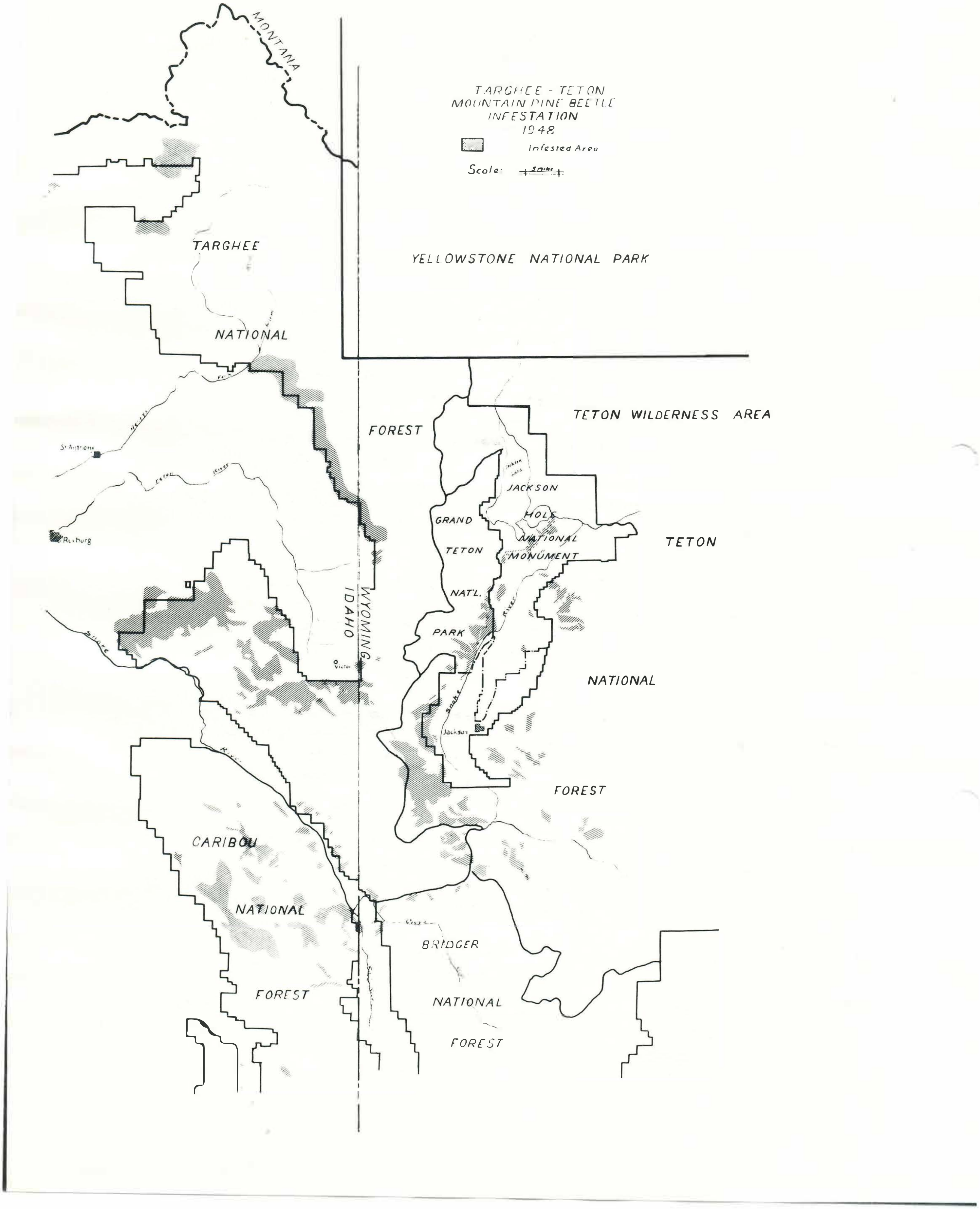
Camp sites on the Targhee Forest are pretty well established. To treat the foregoing units 23, 24, 25, 26, 28, & 29, the camp on Little Pine Creek would no doubt be used. To treat and spot these units would require a little over 1,000 man-days or the output of one 25-man camp for 40 working days.

Unit No. 30	2,200 acres
Rainey Creek	440 infested trees

It is suggested that a spike camp be placed in Rainey Creek to work the area. The road into the drainage is very steep and when wet is nearly impassible. The area itself is very steep and will be difficult to spot. However, it will be mostly a spotting job and it is suggested that the entire area be spotted and mapped before the trees are treated. About 200 man-days are indicated for the work.



Garns Mtn
T.4 N.
R. E.
Mahogany Ridge
TARGHEE NAT'L. FOR.
Scale:
1 Mile
Piney Pass
8074
B M 7784
Mahogany Ridge
Patterson Cr.
Piney Pk
Red Mtn
Red Cr.
TETON CO.
BONNEVILLE CO.
Liars Pk
Cold Spr
hicken Pk
8333
NORTH PINE
Unit No. 31
B M 6691
lack Mtn
Corral Cr.
Rock Spr 6738
T.3 N.
Dry Canyon Spring
WEST PINE
Unit No. 32
B M 5923
Snowslide Gl
Fleming Canyon
Roy Farnes Spr
B M 5866
Poison Creek
Gopher Canyon
Stouts Mtn
8616


TARGHEE - TETON
MOUNTAIN PINE BEETLE
INFESTATION
1948

▨ Infested Area
Scale: 5 miles
MONTANA
YELLOWSTONE NATIONAL PARK
TARGHEE
NATIONAL
FOREST
Warm
Fork
Henrys
St Anthony
Teton
River
Rexburg
IDAHO
WYOMING
Victor
Snake
River
TETON WILDERNESS AREA
JACKSON
HOLE
NATIONAL
MONUMENT
Jackson Lake
GRAND
TETON
NAT'L.
PARK
River
Snake
Jackson
TETON
NATIONAL
FOREST
CARIBOU
NATIONAL
FOREST
Greys
BRIDGER
NATIONAL
FOREST
Salt

Unit No. 31 5,900 acres

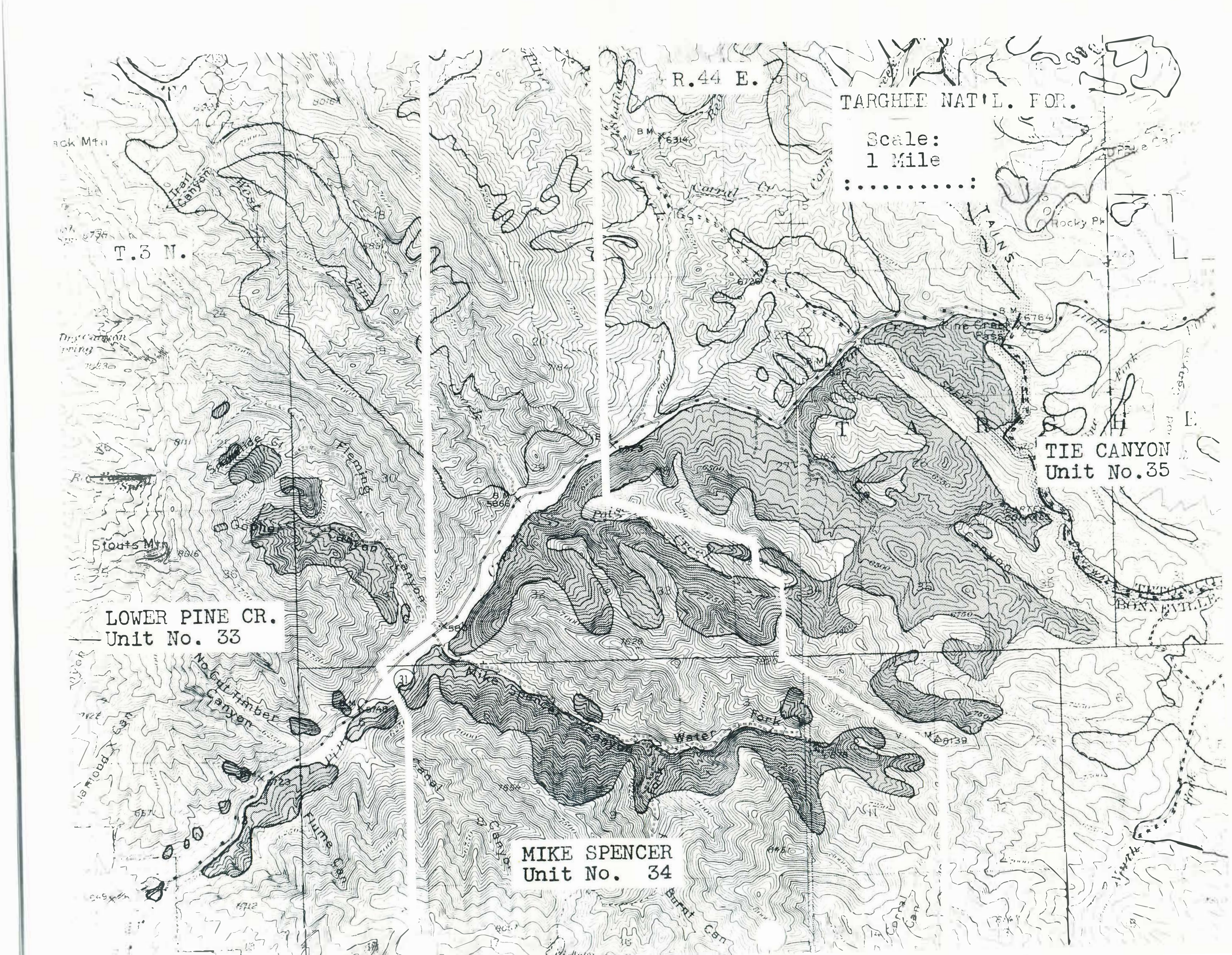
North Pine 1,880 infested trees

The infestation in this unit is very spotty. A belt of heavy infestation extends across the drainage north of Corral Creek. Many infested trees are to be found along the jeep road built last year. About 700 man-days will be needed to finish the control work which indicates a 25-man camp. The camp location is already established at the mouth of Corral Creek. All necessary roads are in but unless 4-wheel drive vehicles are available, considerable work would have to be done before the road could be used.

Unit No. 32 2,000 acres

West Pine 940 infested trees

This area is very rough. The only road extends about half a mile up the drainage. From the end of the road it is about six miles to the end of the type. During the control operations of last spring, a spike camp was up in near the head of the drainage. It is doubtful if the number of infested trees in the head of the drainage are sufficient to warrant a spike camp there again. Consideration should be given to pushing the road up the drainage about two miles farther. Roughly, 300 man-days will be needed to spot and treat this unit.


R.44 E.
TARGHEE NAT'L. FOR.
Scale:
1 Mile
T.3 N.
TIE CANYON
Unit No.35
LOWER PINE CR.
Unit No. 33
MIKE SPENCER
Unit No. 34
Trail Canyon
Stouts Mtn
Fleming
Pine Creek Pass
Corral Cr.
Rocky Pk
Mike Spencer
Fork
Water
Flume Can
Burnt Can
TETON
BONNEVILLE
BM 6314
BM 6764
BM 5866
6139
6148

Unit No. 33	800 acres
Lower Pine Creek	112 infested trees

There are several small patches of lightly infested type in the lower end of Pine Creek. These areas are accessible from the main road and can be worked from a camp farther up the drainage. About 60 man-days should finish the work.

Unit No. 34	1,800 acres
Mike Spencer	1,854 infested trees

This is the most heavily infested unit found on the Targhee Forest during the survey. Treatment in this area last spring was late, which is probably the reason for the high reinfestation. Most of the infested trees are in the Poison Creek drainage, where they occur in rather large groups. Because this unit has a heavier infestation per acre, treatment should require less man-days per tree. Similar areas of last season (Pine Creek) would indicate that 5 trees spotted and treated per man-days could be expected. It is therefore estimated that 375 man-days would do the work. Power pumps as well as hand pumps might be useful in this area.

Unit No. 35	2,800 acres
Tie Canyon	1,200 infested trees

The three units (33, 34, 35) would require a 25-man camp about 35 to 40 working days and could be worked from one camp. The infestation in Tie Canyon is not much different than in the other areas. There are, however some parts of the Tie Canyon unit that is difficult to reach. Hand pumps would be the best type of equipment for this area.

Unit No. 36	2,000 acres
Dog Creek	120 infested trees

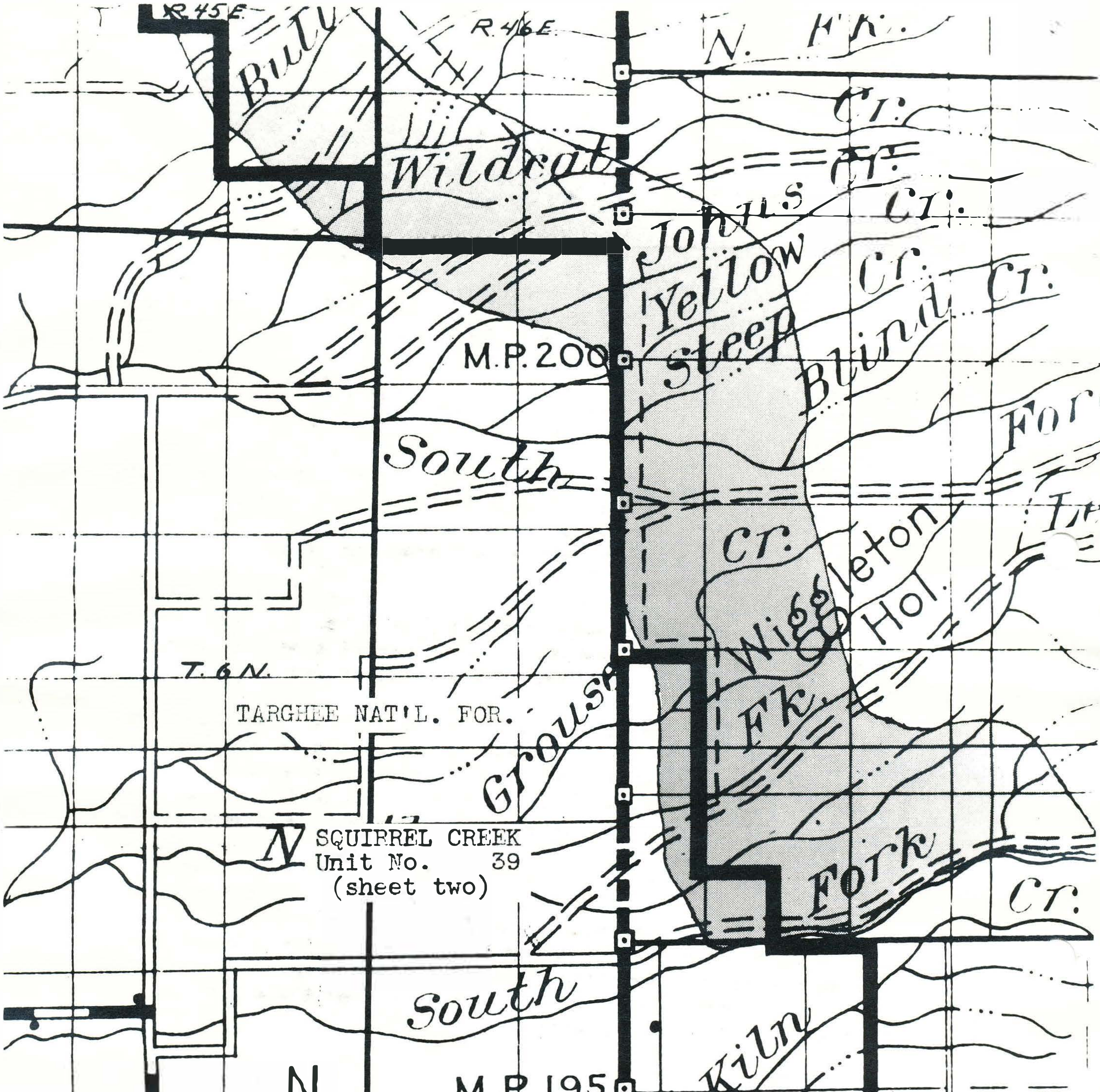
The very light infestation on this unit only warrants a scouting late in the season to pick up as many infested trees as possible by looking for faded foliage.

Unit No. 37	1,800 acres
Cabin Creek	144 infested trees

The same treatment as for the Dog Creek unit is planned for this unit. Because these units are on the Teton National Forest type maps, they are included with those of that forest.

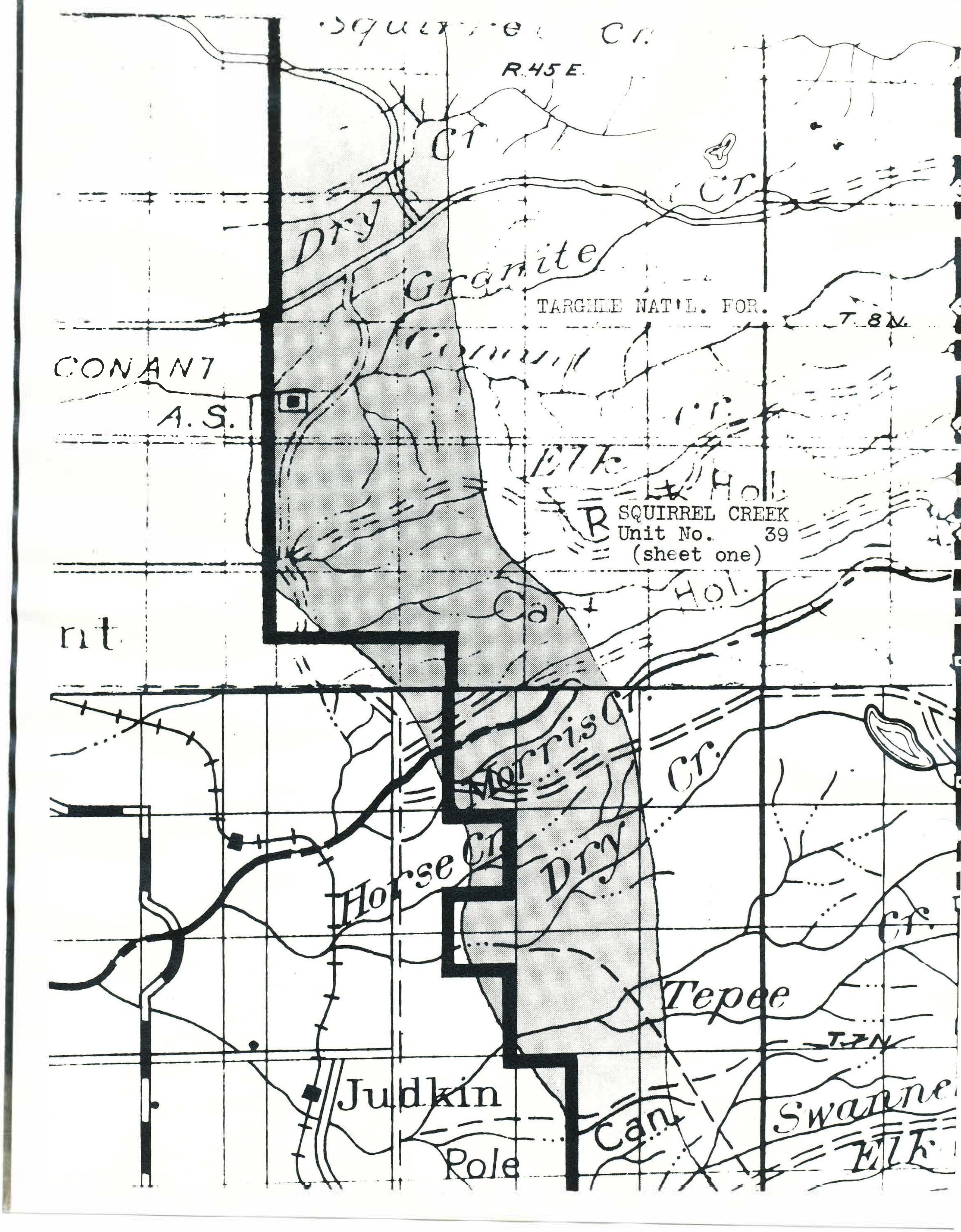
Unit No. 38	1,500 acres
Elk Creek	900 infested trees

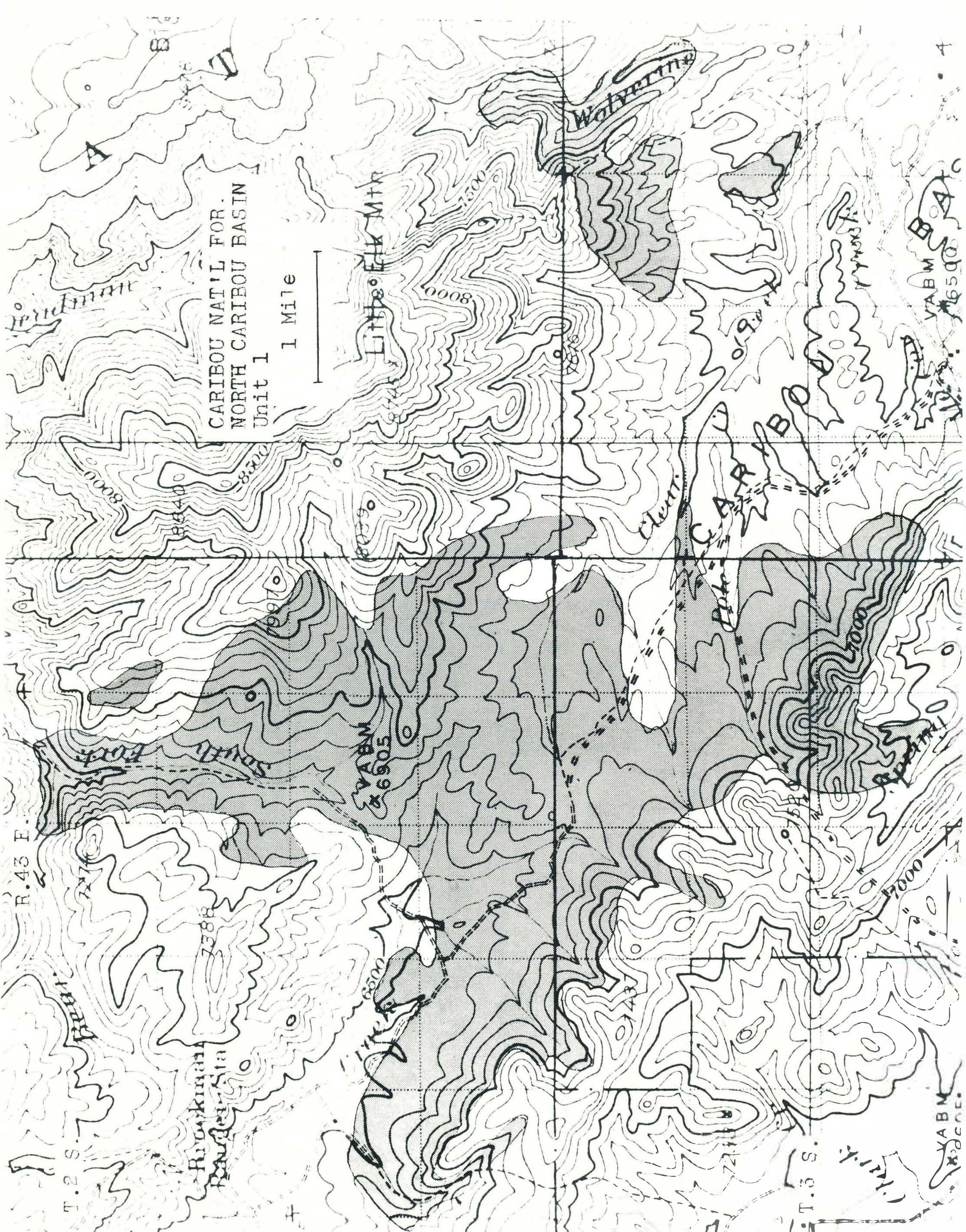
The control work was never completed in this area last spring. It was late in the season before the work was started and not much more than the heaviest parts of the area were treated. The present infestation seems most severe along the Targhee-Teton boundary. Roads and camp location are already established. A spike camp would be the most practical treating unit. Thorough spotting is strongly recommended. It is understood that the Teton Forest will again do the control work in this area. The host type map is included with the maps of the Teton areas. It is estimated that 275 man-days will be required.



SQUIRREL CREEK
Unit No. 39
(sheet two)

R.45E.
R.46E.
Butt
Wildcat
N. Fk.
Cr.
Johns Cr.
Cr.
Yellow
Steep
Cr.
Blind Cr.
M.P.200
South
For
Cr.
Wiggleton
Hol.
T.6N.
TARGHEE NAT'L. FOR.
Grouse
Fk.
Fork
Cr.
N
South
Kiln
N.
M.P.195
Dry
Cr.
Bustle


Squirrel Cr.
R.45 E.
Cr.
Dry
Cr.
Granite
TARGHEE NAT'L. FOR.
T.8N.
CONANT
A.S.
Elk
Cr.
Hol.
R
SQUIRREL CREEK
Unit No. 39
(sheet one)
Can.
Hol.
nt
Morris Cr.
Dry Cr.
Horse Cr.
Dry
Cr.
Tepee
T.7N.
Judkin
Can.
Swanne
Elk
Pole



CARIBOU NAT'L FOR.
NORTH CARIBOU BASIN
Unit 1

1 Mile
R.43 E.
T.2 S.
T.3 S.
Brockman Ranger Sta
Little Elk Mtn
Wolverine
South Fork
Clear
Pike
CARIBOU
VABM 6905
VABM 6590
VABM
7388
8000
8500
8640
8059
7500
7000
6500

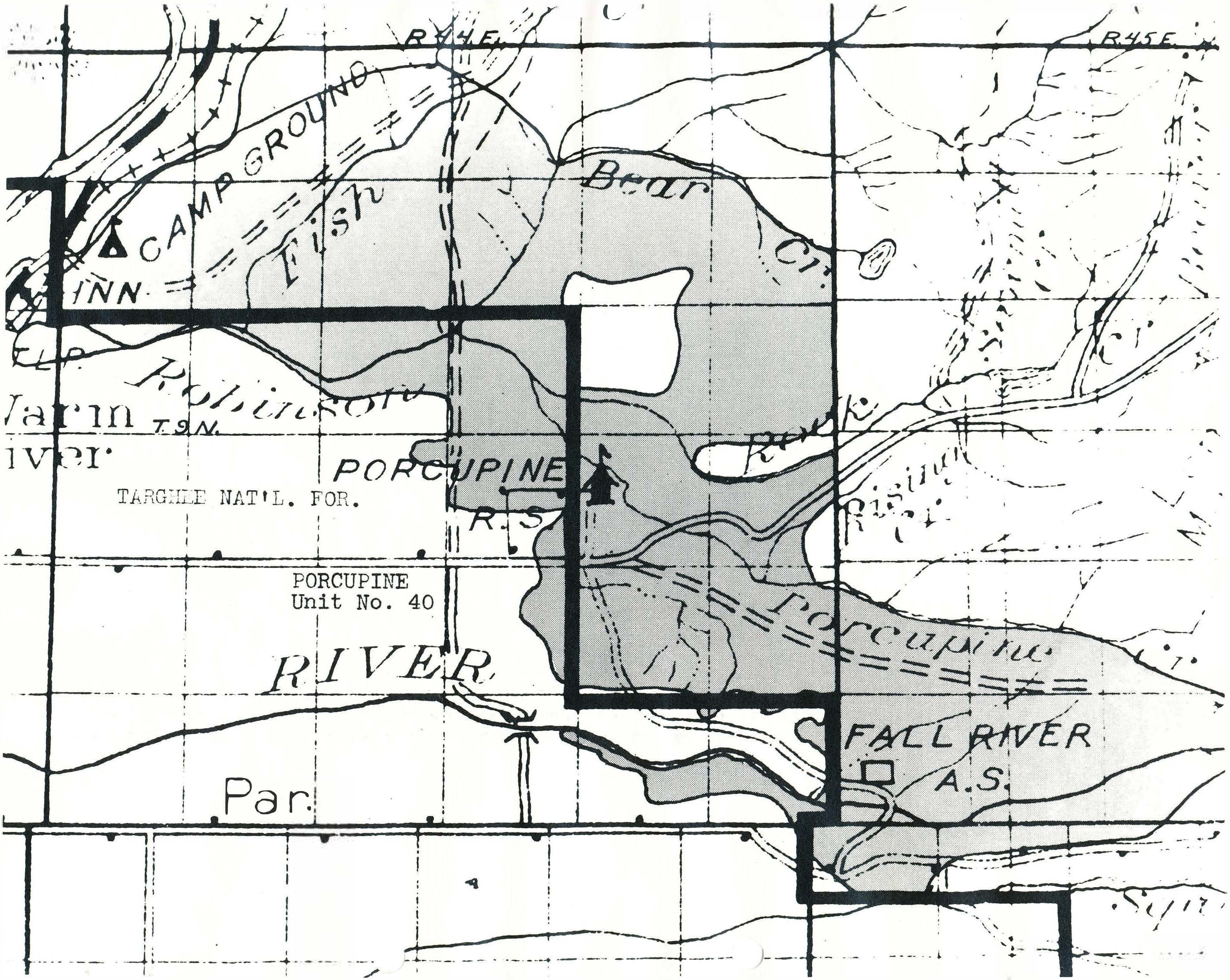
Unit No. 39 18,000 acres

Squirrel Creek 1,260 infested trees

The infestation is scattered along the marginal area and is confined within the shaded portion of the map. In this instance the map does not include all of the type. The type extends many miles northeast of that shown on the northern end of sheet one--in fact becomes continuous with the extensive LPP type in Yellowstone National Park. The infestation is apparently a local condition, built up over the past several years along the Forest boundary. Some of the host type is outside the National Forest and many of the infested trees are on privately owned land. It is felt that much of the build up is due to poor cutting practices on the private land--leaving nearly whole trees as tops where a few logs are cut, peeling the boles of standing trees to make pitch post, etc. Such practices do not create the infestation but does have a concentrating effect by attracting the insects to the vicinity where they attack standing trees.

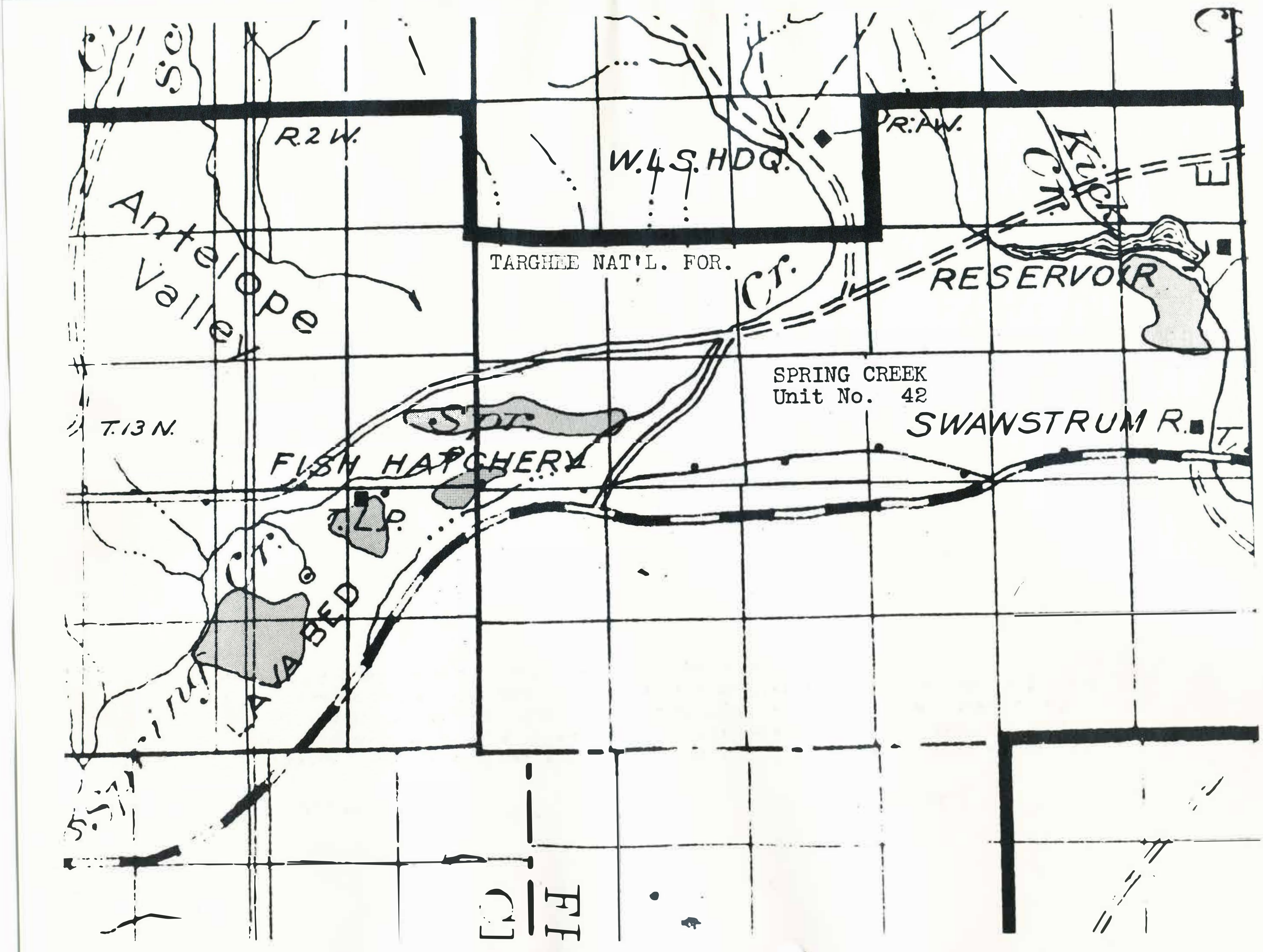
The greatest number of infested trees are to be found between the South Fork of Badger Cr. and the South Fork of Leigh Cr. Both of these drainages are in T. 6N. (sheet two). The attacked trees are mostly in groups of from 3 to 17 and are nearly all close to red tops.

Control measures recommended for this area are to fly very close to the type, which is quite flat, and plot all red tops as accurately as possible on a map. The plotting of these red tops should show something of a pattern and the area to be spotted can be determined from that pattern. This aerial scouting should be done early because there is no point in waiting for the 1948 attacks to fade. It is thought that nearly all the infested trees can be located by this method because the area is well adapted to low flights and the infested trees are associated with red tops. The aerial scouting will determine the acreage to be covered and the method of treatment. As a basis of estimating the man-day requirements, it is thought that the work will be equivalent to covering 6,000 acres and treating the estimated 1,260 trees -- about 460 man-days.


R44E.
R45E.
CAMP GROUND
INN
Fish
Bear
Cr.
Robinson
Warm
T9N.
River
PORCUPINE
R.S.
TARGHEE NAT'L. FOR.
PORCUPINE
Unit No. 40
RIVER
Porcupine
Rock
Rising
Cr.
FALL RIVER
A.S.
Par.

Unit No. 40	13,000 acres
Porcupine	1,430 infested trees

Here, again, is much the same type of infestation as in the Squirrel Creek unit. The infestation is mostly along the timber margin but does extend up the Porcupine drainage somewhat farther. The same treatment as for the Squirrel Creek unit is recommended.


SC
R.2W.
W.L.S. HDQ.
R.1W.
Cr.
Antelope Valley
TARGHEE NAT'L. FOR.
Cr.
RESERVOIR
SPRING CREEK
Unit No. 42
T.13N.
Spr.
SWAWSTRUM R.
FISH HATCHERY
T.L.P.
Cr.
LAVA BED

Unit No. 42	600 acres
Spring Creek	336 infested trees

The five small areas in the Spring Creek unit are all outside the National Forest and are small islands of timber in open flat country. They are easily accessible from the road and should present little difficulty to control. The area will no doubt be treated from a camp in the Hotel or Green Canyon unit and will cause some lost time in travel. This area should be very thoroughly spotted in order to clean it up in a single operation.

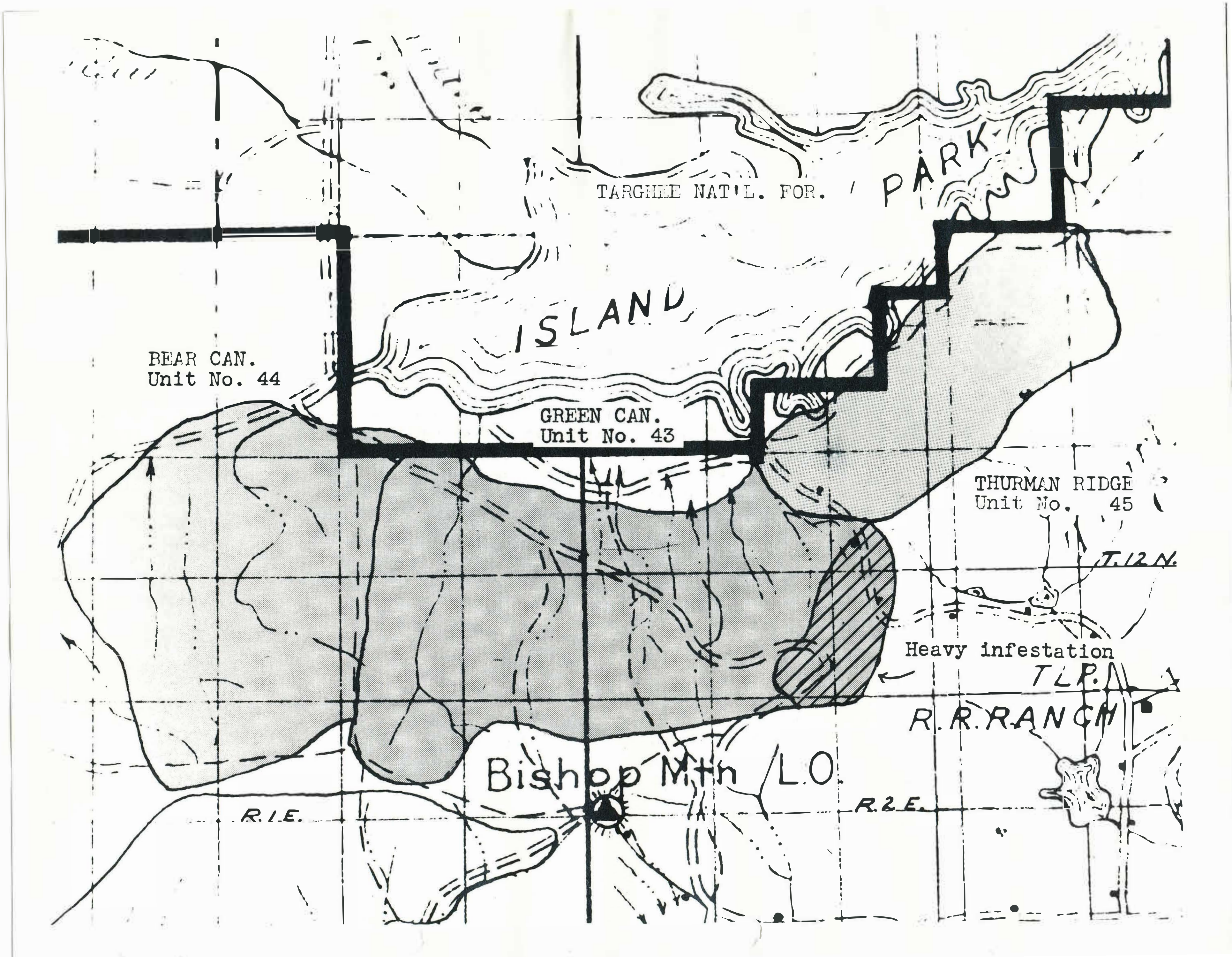
Unit No. 43	5,000 acres
Green Canyon	2,500 infested trees

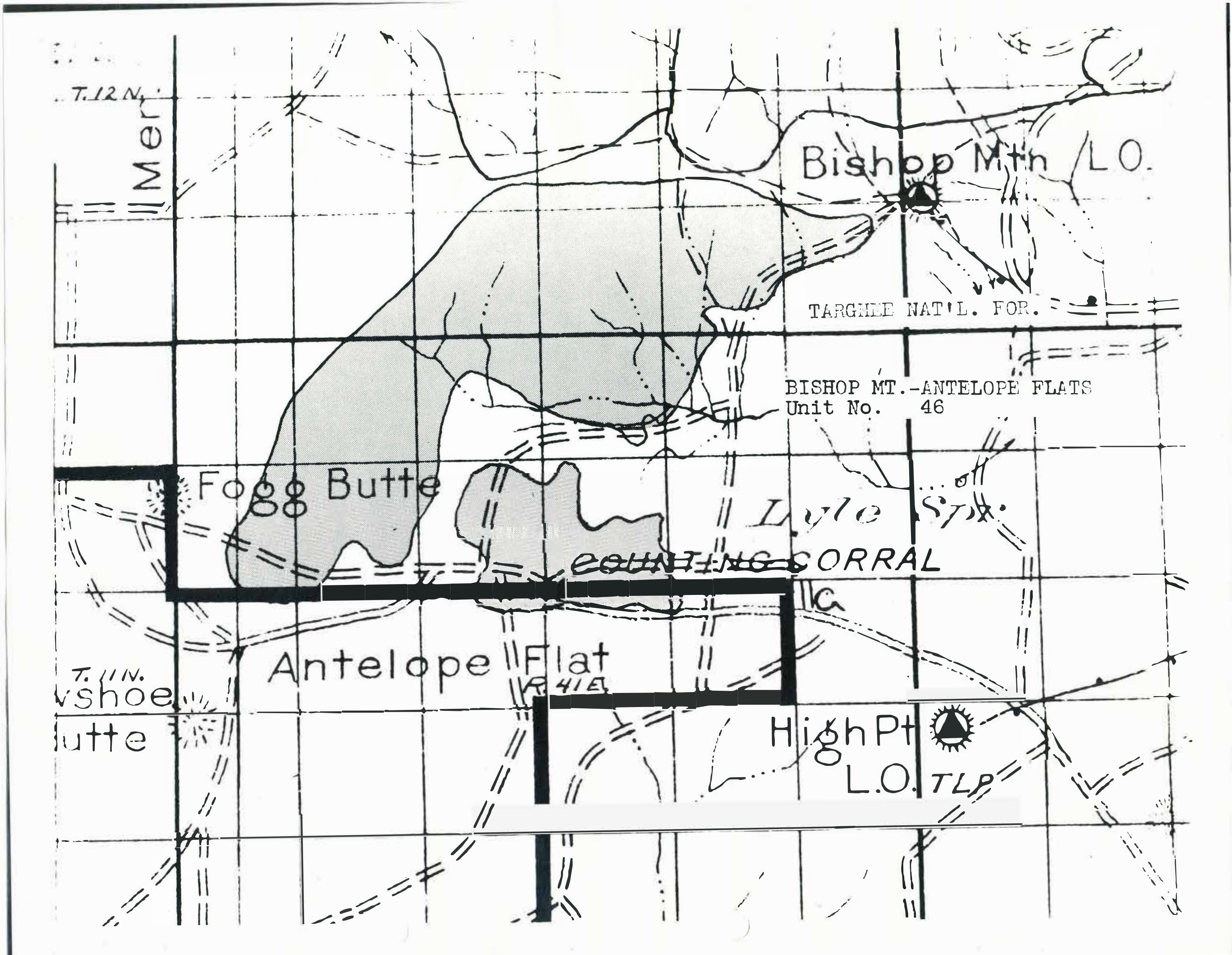
This infestation was discovered by a timber survey party during the summer. The insect survey plans were changed to include the area and all areas adjacent. There is a concentration of attacks on 600 acres in the southeastern corner, shown by cross hatch on the map. The infestation is estimated at 2 trees per acre on the "hot spot" and .3 trees per acre for the balance of the unit.

From all appearances, this infestation has been active in the area for several years and, despite the high infestation per acre, is thought to be in the order of a stand thinning, or at least started that way. The stand is densely stocked pole type with a stocking of 400 to 600 stems per acre. The diameters run from 4 to 10 inches with a few individuals running up to 12 or slightly over. There are quite a few red tops scattered through the stand running from singles to groups of 5 or 6; about half are Ips attacked. Broken topped trees from snow damage are plentiful; they are the smaller poles and are Ips attacked. The area of concentration is on a north exposure and the type near the top of the ridge is mixed with Douglas fir, turning to pure D.F. on the ridge top. It is in the mixed stand that the most numerous mountain pine beetle attacks occur. They are in groups of 2 to 5, occasionally 6 to 8. About one out of three is one-sided; not many are pitched out. Strangely, farther north along the margin where the type is more mature, and apparently a better bug type, there are but few attacks.

A power pump would be of advantage in treating the area of concentration. The area is close to a road and is good ground to work on. A high production should be made here.

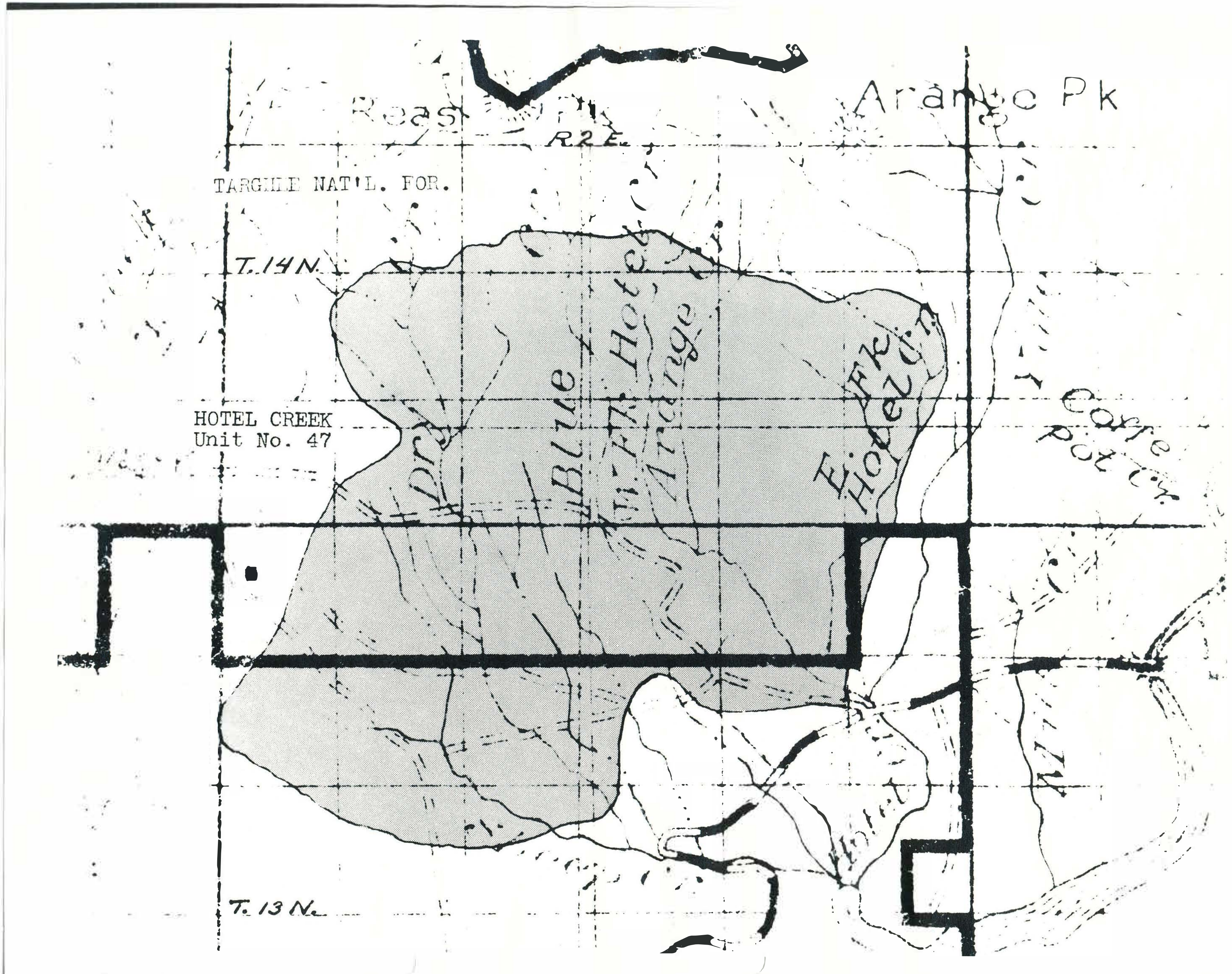
Spotting will probably take 275 man-days; treating 250 to 300.


TARGHEE NAT'L. FOR.
PARK
ISLAND
BEAR CAN.
Unit No. 44
GREEN CAN.
Unit No. 43
THURMAN RIDGE
Unit No. 45
T.12 N.
Heavy infestation
T.L.P.
R.R. RANCH
Bishop Mtn L.O.
R.1.E.
R.2.E.


T.12N.
Mer
Bishop Mtn L.O.
TARGHEE NAT'L. FOR.
BISHOP MT.-ANTELOPE FLATS
Unit No. 46
Fogg Butte
Lyle Spr.
COUNTING CORRAL
Antelope Flat
T.11N.
R.41E.
vshoe
utte
High Pt
L.O. TLP

Units 44, 45, and 46	9,800 acres
Bear Can., Thurman Ridge and Bishop Mountain	430 infested trees

These areas lie adjacent to the Green Canyon unit and while the control work is in progress an attempt will be made to locate as many spots of infestation by plane as possible in these units. The flying should be done rather late so as to take advantage of fading foliage. It is felt that most of the infested trees on these areas will be found near red tops -- at least a high enough percentage of them to make the undertaking worthwhile.


Reas Pk
Arange Pk
R2E.
TARGILE NAT'L. FOR.
T.14N.
HOTEL CREEK
Unit No. 47
Dry
Blue
W. Fk. Hotel
Arange
E. Fk. Hotel Cr.
Coffee Pot Cr.
T.13N.

Unit No. 47	12,000 acres
Hotel Creek	2,500 infested trees

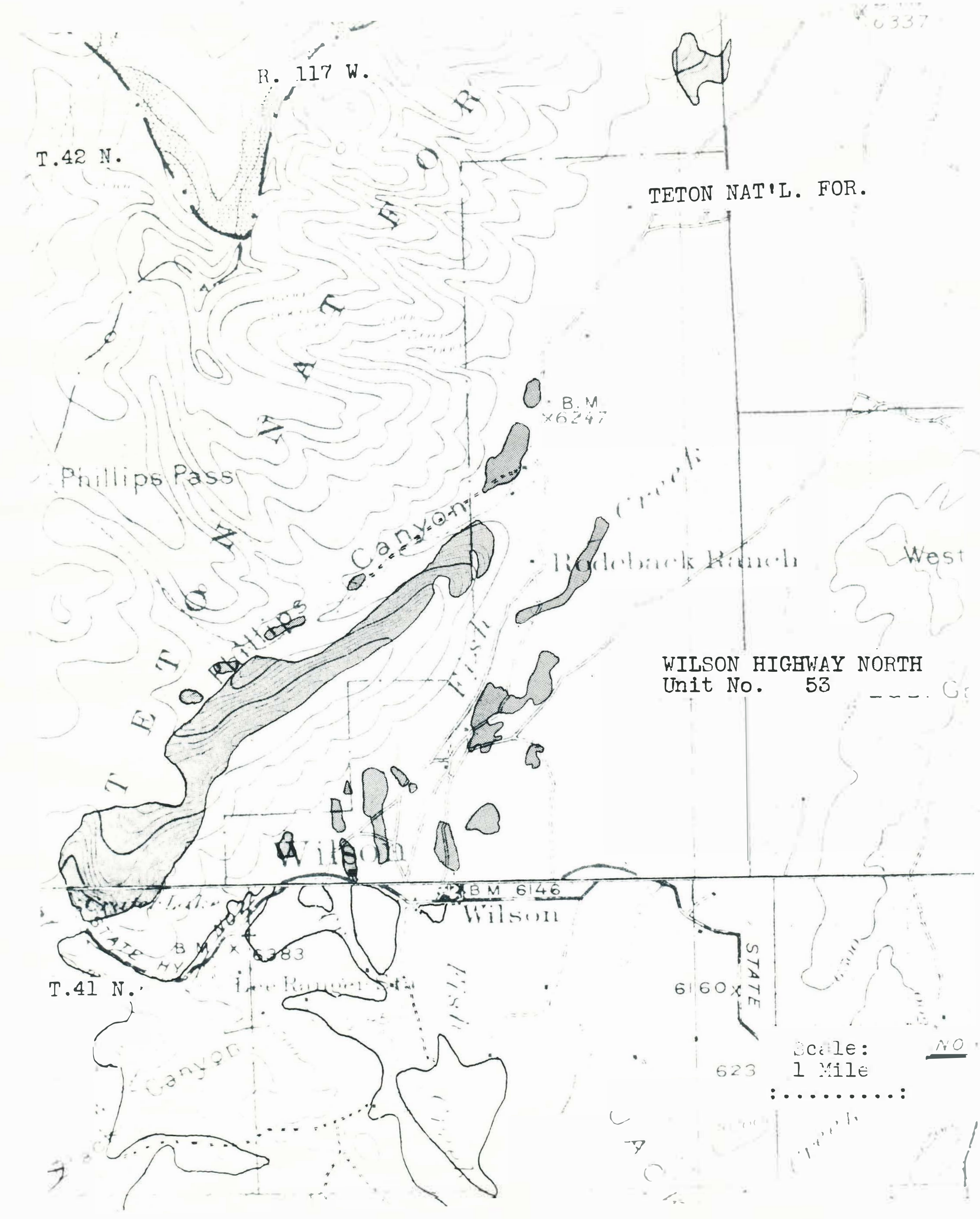
The infestation is well distributed over the area in scattered singles and in small groups. Some control work was done in the area last spring when 999 infested trees were treated in the lower part of the area. Several roads make the area fairly accessible although there are some high bench-like areas between Arange Creek and the E. Fk.of Hotel Creek that will be harder to get into. It is roughly estimated that 1,125 man-days will complete the work.

Unit No. 41 14,000 acres

Falls River endemic infestation

Sample strips of a reconnaissance nature were run between the Porcupine unit and the southwestern corner of Yellowstone National Park. An examination of the type was made along the Reclamation Road east to the Teton Divide and in the Bechler Basin. Practically no infestation was found.

Including the Falls River area a total of 1,234 acres of sample strip was run in units 41, 48, 49, 50, 51, and 52 on a reconnaissance basis or .8 percent of the 155,000 acres. Only an occasional infested tree was found in these areas which include all of the type north of the porcupine to the Montana State line, east to the Yellowstone Park boundary, and west to Big Bend Ridge. In addition to the reconnaissance strips, low level flights were made over the entire area searching for red topped trees. Trees spotted proved to have been killed by other causes (ground fire and beaver were most numerous).



WILSON HIGHWAY NORTH
Unit No. 53

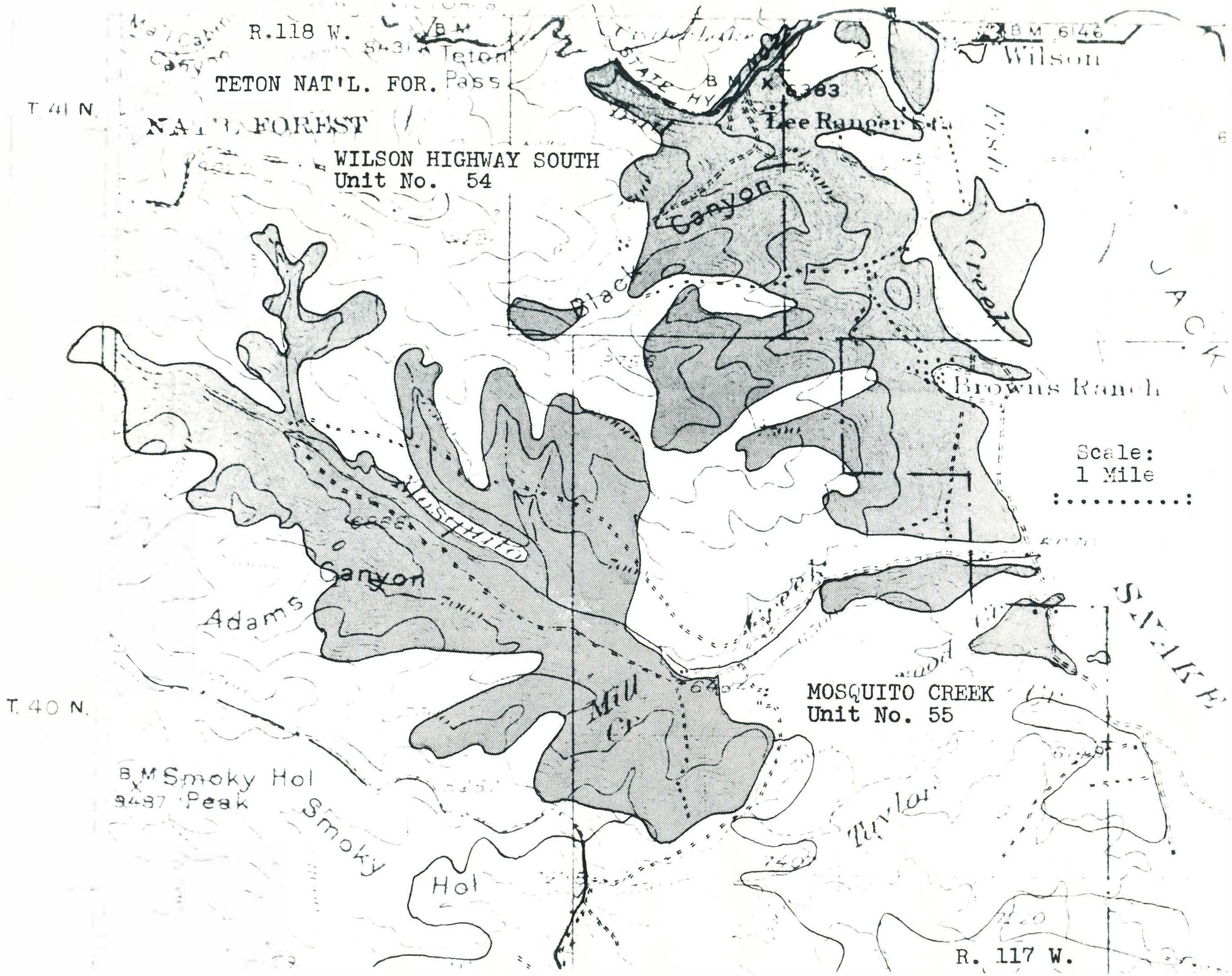
R. 117 W.
T.42 N.
TETON NAT'L. FOR.
TETON NATIONAL FOR
Phillips Pass
Phillips Canyon
Fish Creek
Rodeback Ranch
West
B.M. ×6247
Wilson
BM 6146
Wilson
STATE HY.
BM × 6383
Ice Ranger Sta.
T.41 N.
6160×
STATE
623
Canyon
Scale:
1 Mile
NO
6337

TETON NATIONAL FOREST

Unit No. 53 — 1,987 acres

Wilson Highway North — 300 infested trees

The infestation is spotty but distributed over the entire unit. The area includes all of the host type north of the Wilson-Victor highway to the Jackson Hole National Monument boundary. All of the smaller patches of timber shown are of easy access by road but the long Phillips Canyon ridge area is difficult to reach. A short logging road extends from Crater Lake at the southwestern corner up to within a half mile of the top of the ridge and would provide the easiest route to the top. However, the ridge is about four miles long and nearly inaccessible from the northeast end. Control measures of last spring were not completed on this ridge. During the spring control project it should be thoroughly cleaned up. Because of the difficulty of working part of this area it is felt that 200 man-days will be required to do the job. Hand pumps would be the best for treatment.

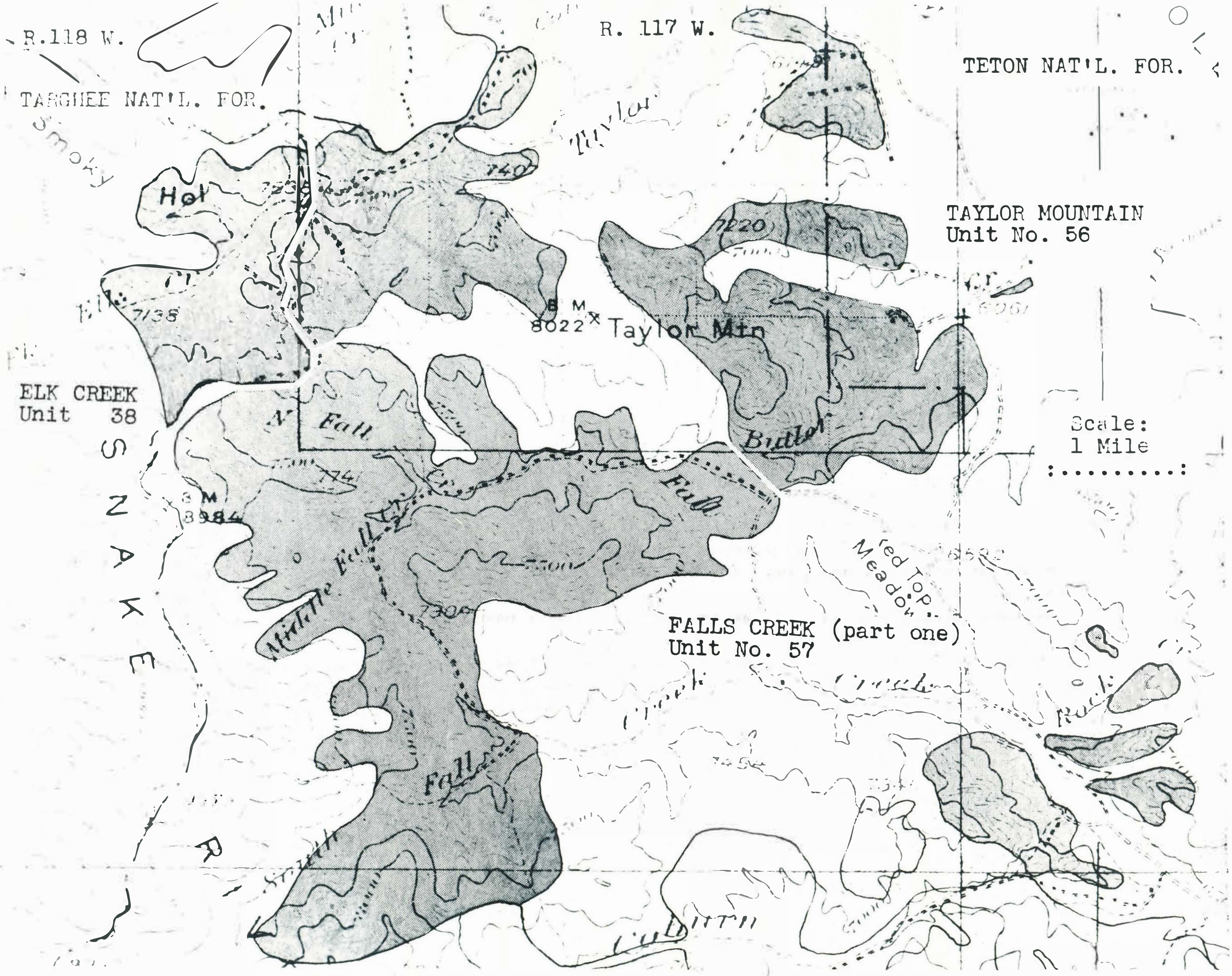

R.118 W.
TETON NAT'L. FOR.
NAT'L FOREST
T 41 N.
Teton Pass
8431
WILSON HIGHWAY SOUTH
Unit No. 54
STATE HY
X 6383
Lee Ranger Sta.
B M 6146
Wilson
Fish Creek
Canyon
Black
JACK
Browns Ranch
Scale:
1 Mile
Mosquito
Canyon
Adams
Creek
SNAKE
Mill Cr.
MOSQUITO CREEK
Unit No. 55
T. 40 N.
B M Smoky Hol
9487 Peak
Smoky
Hol
Taylor
R. 117 W.

Unit No. 54	4,570 acres
Wilson Highway South	960 infested trees

The residual infestation left after two seasons control on this unit is well distributed over the area. It is worth noting that about 17,000 infested trees have been treated here during the past two years. Control measures are again recommended on a clean-up basis. Down timber and steep slopes would indicate that a thorough spotting job followed by treating would be the best procedure. All necessary roads have been built and the area is easily reached except for some of the very highest points. It is estimated that 237 man-days spotting and 190 man-days treating will be necessary to do the work.

Unit No. 55	5,300 acres
Mosquito Creek	1,272 infested trees

The 1948 distribution of the infestation is spotty. Like most other control areas, it will be a big spotting job. Roads are available but too rough for anything but 4-wheel drive vehicles. Mud during the spring is a handicap in this drainage. It is estimated that 530 man-days will do the work.


R.118 W.
R. 117 W.
TARGHEE NAT'L. FOR.
TETON NAT'L. FOR.
Smoky
Hol
Taylor
740
7220
TAYLOR MOUNTAIN
Unit No. 56
Cr.
7/38
B M
8022
Taylor Mtn
ELK CREEK
Unit 38
N Fall
Butler
Scale:
1 Mile
774
B M
8984
Fall
Middle Fall Cr.
7300
7300
Red Top Meadow
FALLS CREEK (part one)
Unit No. 57
Creek
Creek
Rock
SNAKE R
Fall
South
Cabin

Unit No. 56 3,860 acres
Taylor Mt. 849 infested trees

There are three former control areas included in this revised unit. The Upper Taylor Creek stand which extends to the Teton-Targhee boundary, 1,440 acres, Taylor Bench 320 acres, and the type in Butler Creek, 2,100 acres. Each of these three areas have between 200 to 300 infested trees. The Taylor bench area, having the smaller acreage, is therefore more heavily infested.

The host type map has been greatly corrected since the last survey and is now fairly accurate. Roads, as shown, are sufficient for control purposes although they are strictly 4-wheel drive "Jeep-ways". The Taylor bench and Butter Creek areas are fairly free from down timber and are not difficult to get around in. The head of Taylor Creek, although not steep, is difficult. The windfall condition is such that hand packing of oil would be advisable in many parts of it.

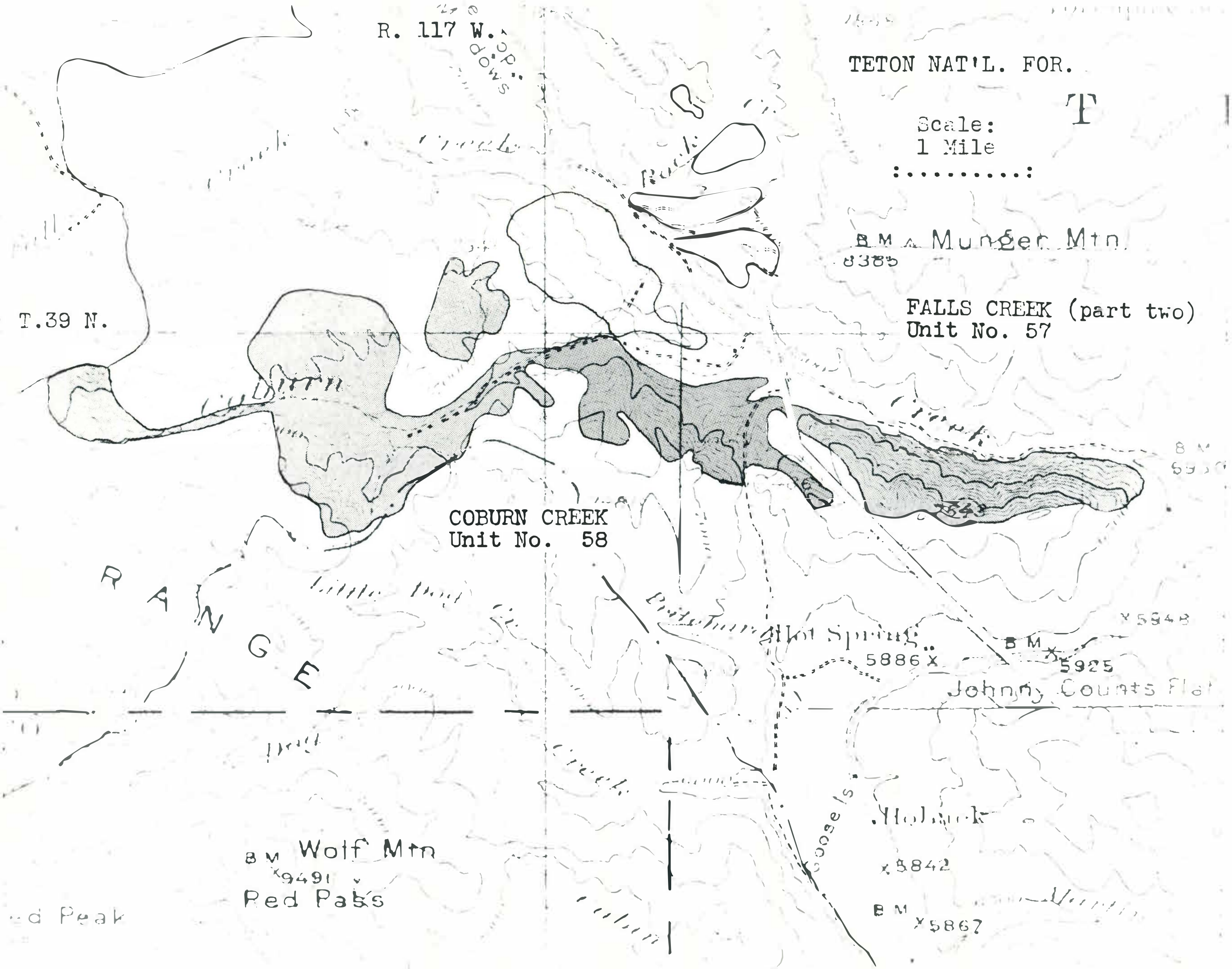
A well organized crew with hand pumps should spot and treat the area in 350 to 400 man-days.

Unit No. 57 7,680 acres

Falls Creek 1,382 infested trees

All the host type in the Falls Creek drainage has been thrown into this single unit. The areas are shown on two map sheets.

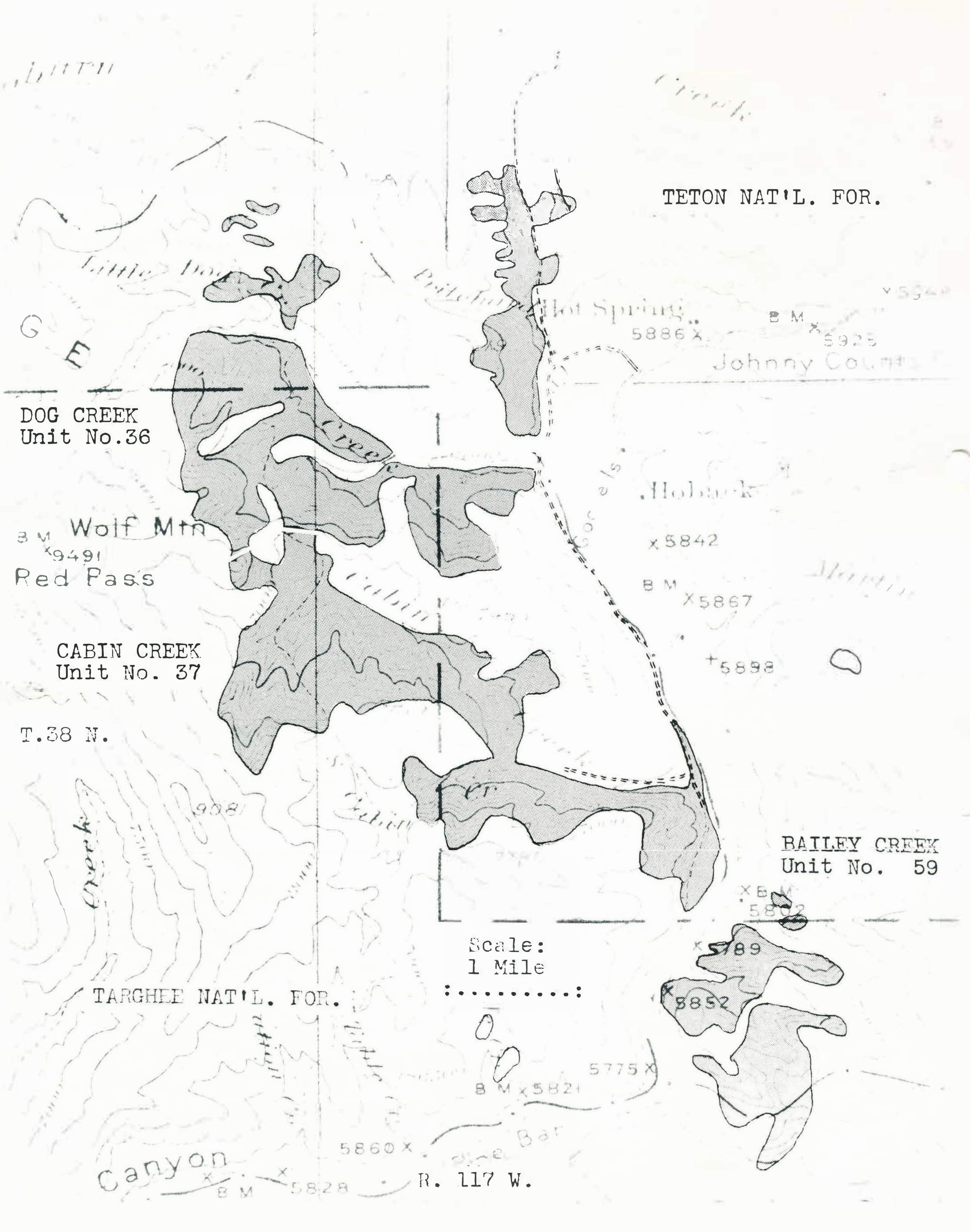
While there is a light infestation distributed throughout the drainage, the head of the South Fork has a much heavier infestation. Also there are quite a number of attacks along the newly constructed road where trees were damaged. In parts of this unit many acres will need be covered for each infested tree. The spotting job will be the main effort. About 700 man-days is estimated for the job.


R. 117 W.
TETON NAT'L. FOR.
Scale:
1 Mile
BM Munger Mtn
8385
T.39 N.
FALLS CREEK (part two)
Unit No. 57
Coburn
Creek
COBURN CREEK
Unit No. 58
RANGE
Hot Spring
5886
BM 5925
5948
Johnny Counts Fla
Goose Is
5842
BM 5867
BM Wolf Mtn
9491
Red Pass
ed Peak
Creek

Unit No. 58 2,000 acres

Coburn Creek 280 infested trees

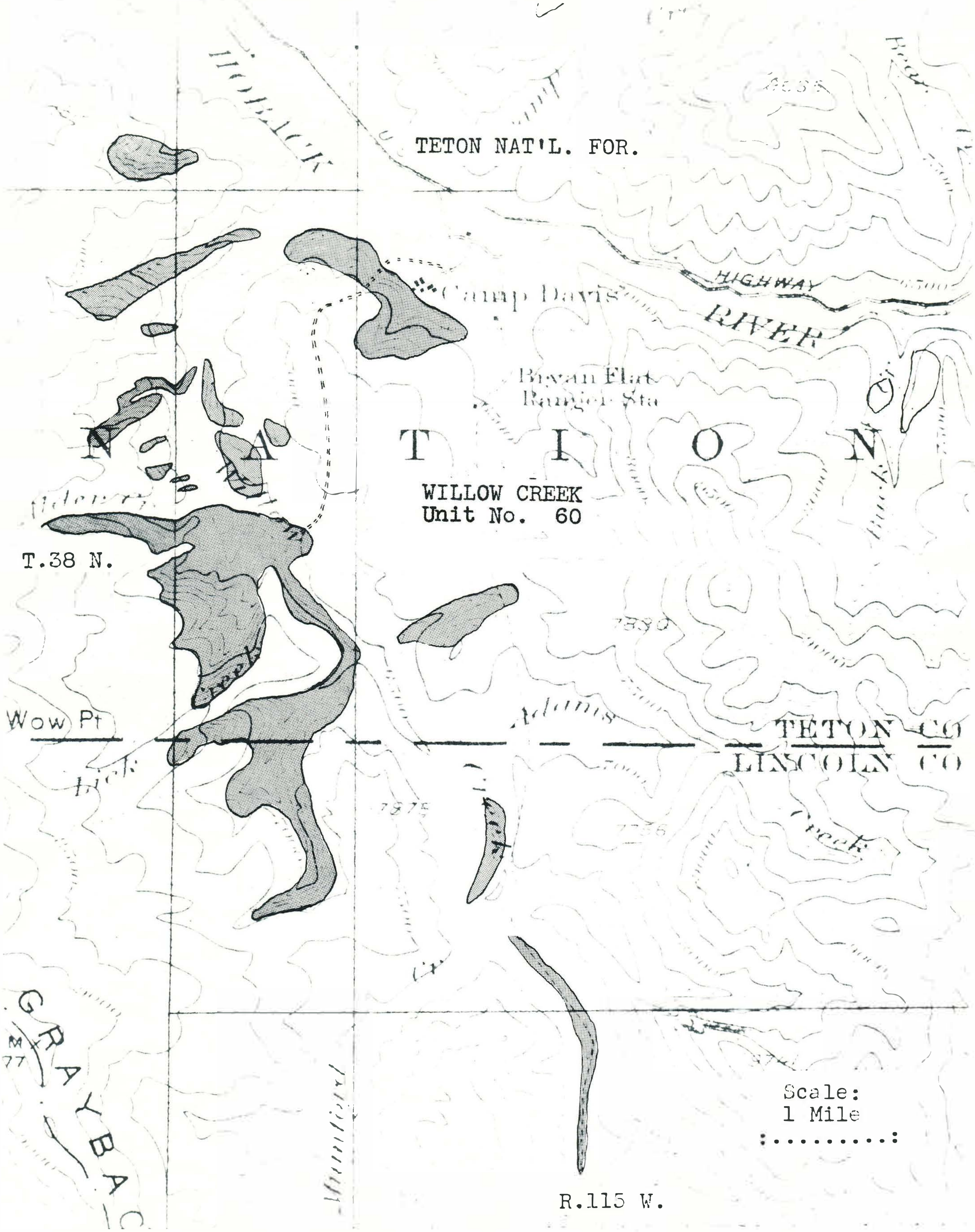
A very few infested trees scattered over the area. This will be mostly a spotting job of 100 man-days with 25 to 50 man-days treating. The upper part of the area is very steep in spots.


TETON NAT'L. FOR.
DOG CREEK
Unit No.36
Wolf Mtn
BM
9491
Red Pass
CABIN CREEK
Unit No. 37
T.38 N.
Hot Spring
5886
BM
5925
Johnny Count
Holback
5842
BM
5867
5898
BAILEY CREEK
Unit No. 59
BM
5802
5789
5852
Scale:
1 Mile
TARGHEE NAT'L. FOR.
5775
BM
5821
5860
Canyon
BM
5828
R. 117 W.
Creek
Cabin
Cr.

Unit No. 59 700 acres

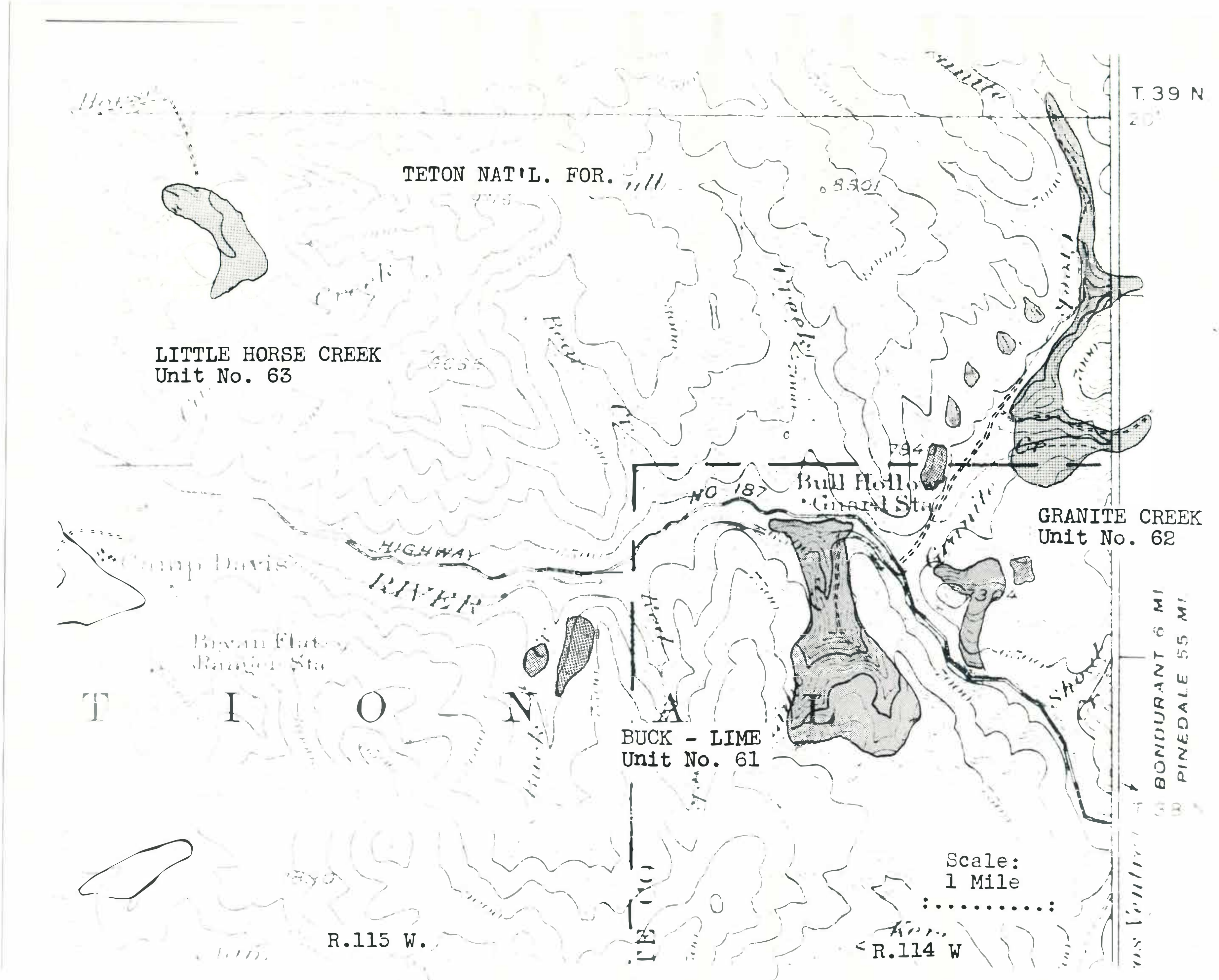
Bailey Creek 91 infested trees

A small part of this unit is on the Bridger Forest. The topography is bench-like and broken up by short, steep drainages. It is a rather easy area to work. Because it is not close to any other control area, a spike camp would seem to be the best plan. Between 35 to 50 man-days should do the work.


HOBACK
TETON NAT'L. FOR.
HIGHWAY
Camp Davis
RIVER
Bryan Flat
Ranger Sta
NATION
WILLOW CREEK
Unit No. 60
T.38 N.
Creek
Wow Pt
Adams
TETON CO
LINCOLN CO
Creek
Creek
GRAYBAC
Scale:
1 Mile
R.115 W.

Unit No. 60	2,240 acres
Willow Creek	22 infested trees

No control recommended in this area. Although control measures were cut short in the unit last spring, all the heavy areas of infestation were treated, leaving only the higher areas. Apparently control was very effective.


T.39 N
TETON NAT'L. FOR.
8501
LITTLE HORSE CREEK
Unit No. 63
NO 187
HIGHWAY
RIVER
Bull Hollow
Guard Sta
Camp Davis
Bryan Flat
Ranger Sta
T I O N A L
GRANITE CREEK
Unit No. 62
7304
BUCK - LIME
Unit No. 61
BONDURANT 6 MI
PINEDALE 55 MI
T.38
Scale:
1 Mile
R.115 W.
R.114 W

Unit No. 61 500 acres

Buck & Lime Creeks Endemic

No sample strips were run in this unit because of an error in plotting. Later, a search of the unit was made and no infested trees were found. Control measures of last spring were apparently successful in reducing the infestation to near zero.

Unit No. 62 3,000 acres

Granite Creek 210 infested trees

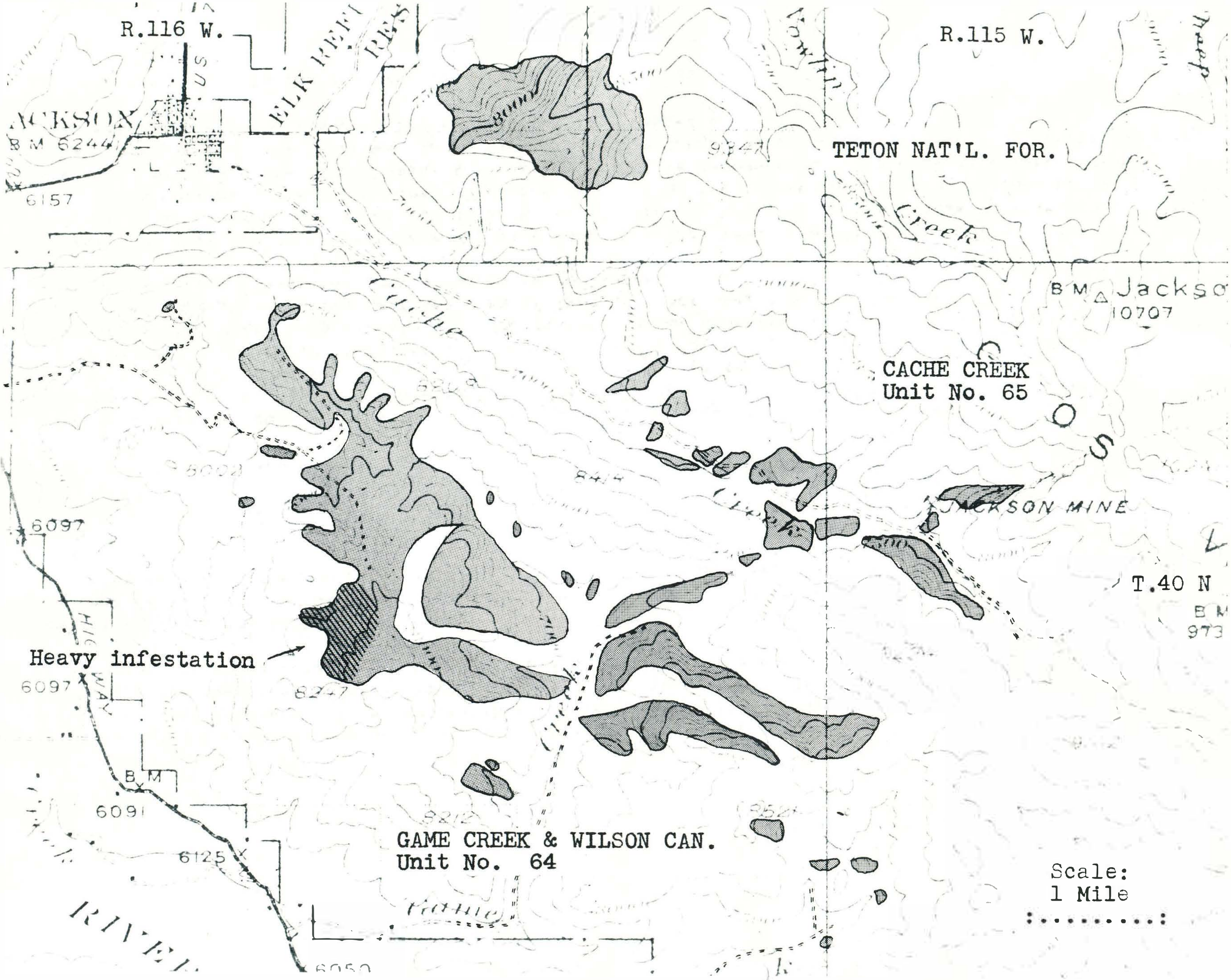
Control measures are recommended for about a third of this area where a few groups of infested trees can be treated. Most of the infested trees are east of Battle Mountain and in the small patches north of Granite Creek. The head of Granite Creek should be scouted later in the season.

About 50 man-days work are indicated for the treatment of this area.

Unit No. 63 300 acres

Little Horse Creek 45 infested trees

This small area should be carefully scouted and treated. Ten to 15 man-days would be necessary to clean it up.


R.116 W.
R.115 W.
TETON NAT'L. FOR.
JACKSON
B M 6244
6157
US
ELK REFU
RES
Flat
Creek
B M Jackso
10707
9847
CACHE CREEK
Unit No. 65
Cache
Creek
8444
JACKSON MINE
T.40 N
B M
973
6097
Heavy infestation
8247
HIGHWAY
6097
B M
6091
6125
RIVER
6050
8212
GAME CREEK & WILSON CAN.
Unit No. 64
Game
Scale:
1 Mile

Unit No. 64 2,500 acres

Game Creek & Wilson Canyon 400 infested trees

The control measures of last spring were very thorough. Scattered, single, infested trees are found occasionally throughout the area, but nowhere in any numbers except the hatched portion shown. In this instance, it is thought that the infestation in the concentrated pocket is definitely the result of a flight into the area during the summer. About 200 acres are infested to about one tree per acre as an average. Several quite large groups are to be found.

Control measures are recommended for the "hot spot" which should take about 50 to 75 man-days. It might be stated that the survey was not intensive enough to definitely fix the boundary of the infested area. Further scouting should be done during the control project.

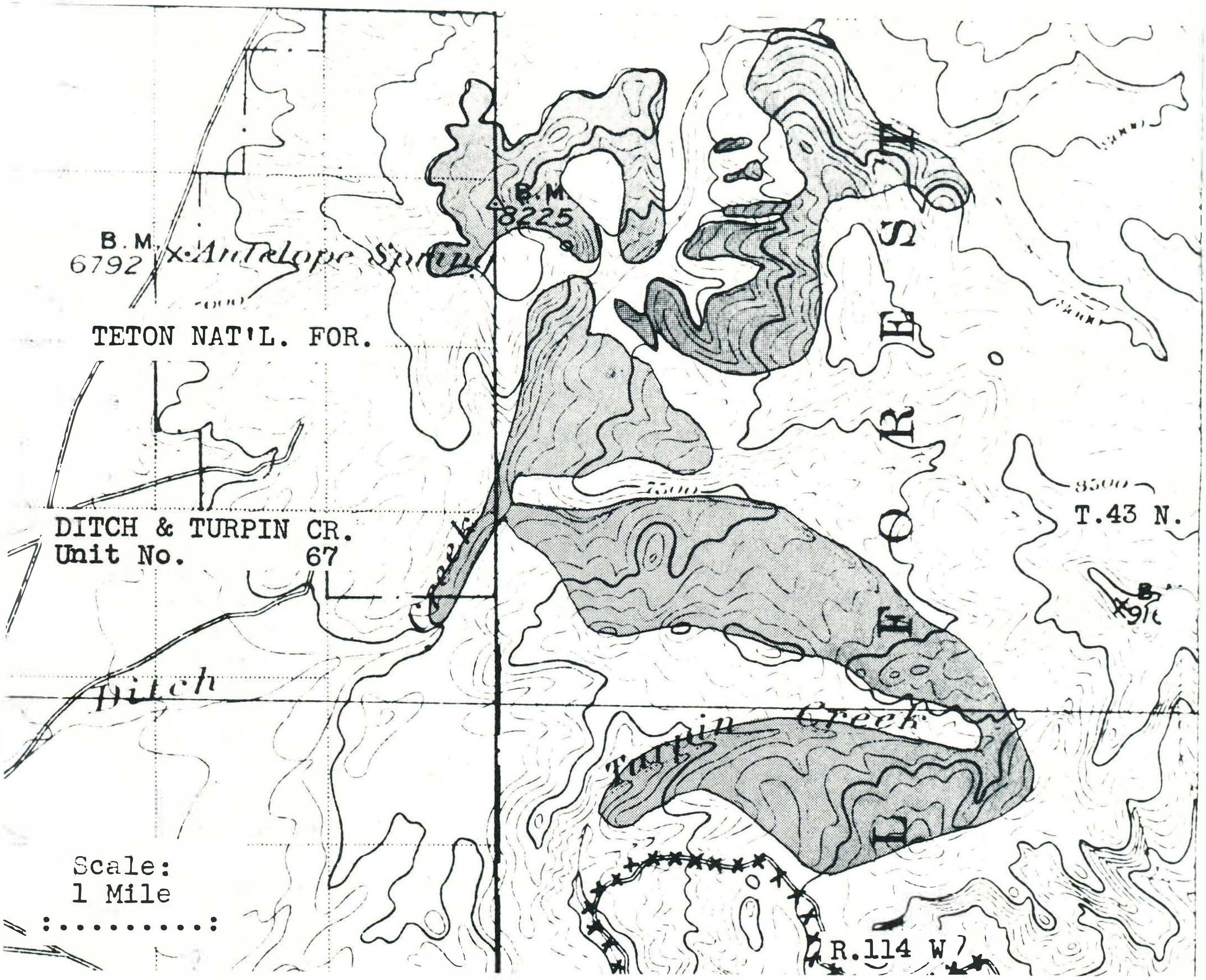
Unit No. 65 1,020 acres

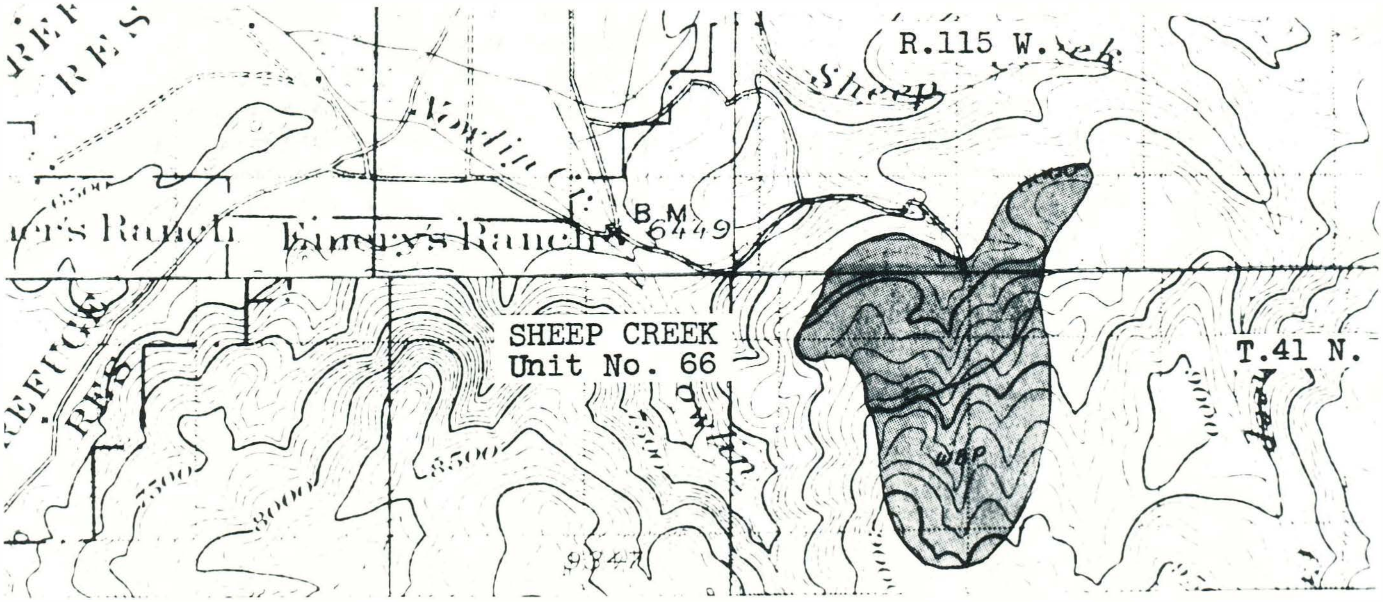
Cache Creek 326 infested trees

Although a very thorough control job was done along Cache Creek in this area, sample strip data indicate a surprising degree of infestation. The small patches of type in the Cache Creek drainage and the larger 670 acre stand along the ridge top are both infested to about the same extent. The latter area is very difficult to treat. Pack stock can be taken up Woods Canyon on the south side or up the southwestern point. Both are hard chances taking approximately an hour and a half to climb. Only one small spring near the edge of type in Woods Canyon offers the possibility of a small spike camp. The spring drys up early in the season.

Treatment of this high area last year was very much of a "hot spot" treating job, finished in a few days by treaters on horses riding up each day to work and treating as many trees as they could find. This work was undertaken during the last few days of the project and no other method could have been followed. Treatment during the coming project is recommended to be done on a very thorough basis. Because the area is broken up in so many small patches, fewer acres per man-day spotting can be expected. About 160 man-days for the unit will be necessary.

All infested W.B.P. in the area should be treated where found.


B.M. 8225
B.M. 6792
Antelope Spring
TETON NAT'L. FOR.
FOREST
7500
8500
T.43 N.
DITCH & TURPIN CR.
Unit No. 67
Creek
Ditch
Turpin Creek
Scale:
1 Mile
R.114 W.


REFUGE RES.
R.115 W.
Sheep Creek
Emery's Ranch
B.M. 6449
SHEEP CREEK
Unit No. 66
T.41 N.
8500
9847

Unit No. 66 970 acres

Sheep Creek 187 infested trees

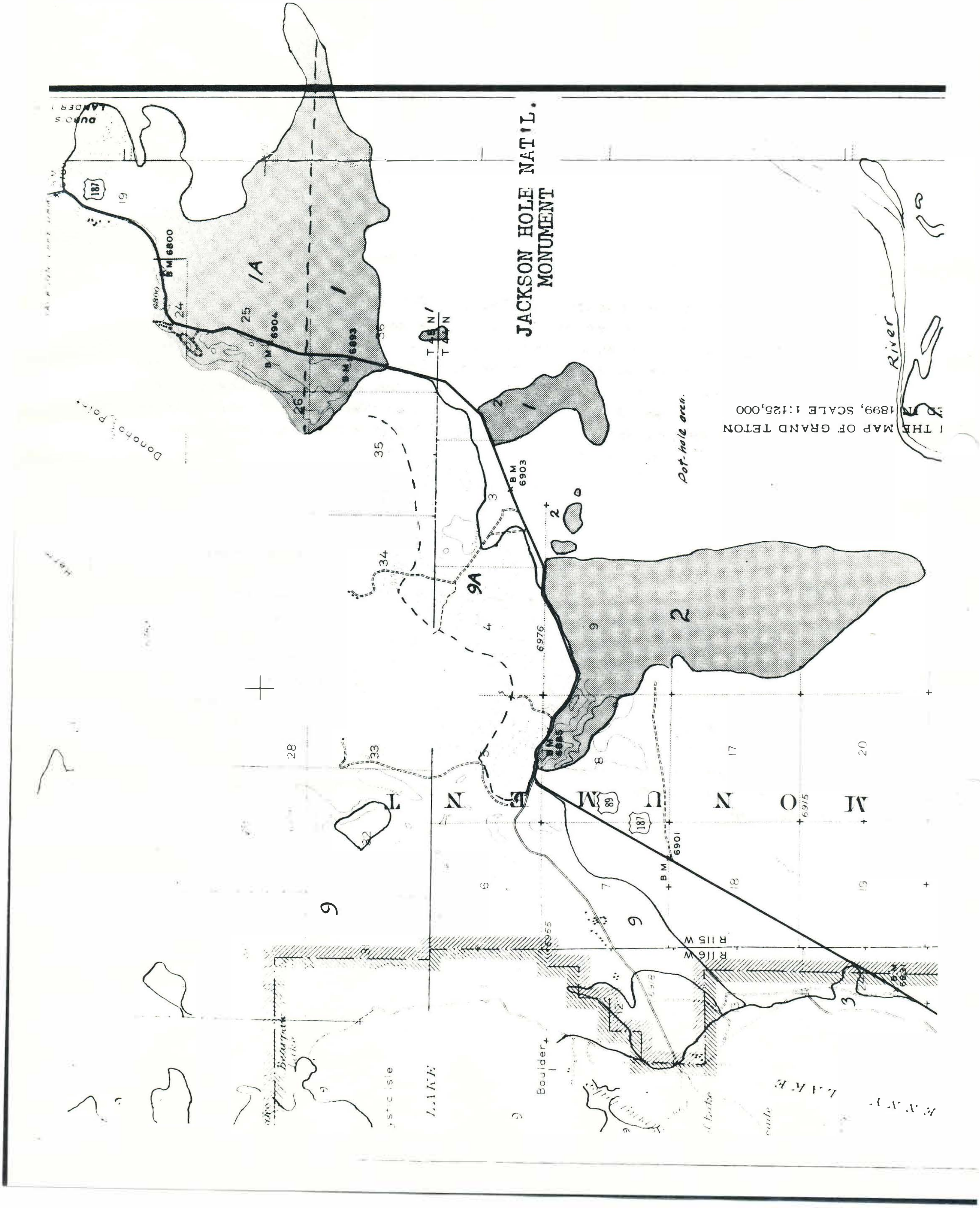
There is much doubt as to the validity of the above estimate. Only an endemic infestation was recorded in 1947 and all of the infested trees were found in one group at the edge of the type during the 1948 survey. It is felt, therefore, that an occasional small group of infested trees may be found along the marginal area at the edge of type. Treatment is recommended on the basis that the edge of type be spotted for a distance of 10 to 15 chains into the type.

In addition to the 87 infested lodgepole pine estimated, about 100 WBP are infested in a pocket of nearly solid WBP adjacent to the lodgepole pine stand. Because this is a rather solid body of WBP and because of its proximity to the stands of lodgepole pine, it is recommended that control measures be taken to reduce the infestation in the WBP. It is, however, recommended that thorough scouting of the WBP area be undertaken prior to control work.

Unit No. 67 & 68 5,300 acres

Ditch, Turpin & Lost Cr. 1,550 infested trees

All but the 320 acres in the Lost Creek drainage is untreated infestation. This area was by-passed by the extensive survey of 1947. The attacked trees were reported early in the summer by Forest Service personnel. The area was scouted on the ground and by plane. The sketch of the type was made by aerial observation and the area was later surveyed by sample strip. The infestation occurs largely in small to sizeable groups and is well distributed over the area. A road reaches to Antelope Point but little of the Ditch or Turpine drainages are accessible by road. It would perhaps be advisable to push a road up Ditch Creek and to the top of the ridge between Ditch and Turpin Creek. Much of the area is relatively flat on top with open areas. It is estimated that 600 to 700 man-days will be required to spot and treat this area.


JACKSON HOLE NAT'L. MONUMENT
M O N U M E N T
1A
1
2
9A
9
3
BM 6800
BM 6904
BM 6893
BM 6903
BM 6901
6976
6915
187
89
T 45 N
T 44 N
R 115 W
R 116 W
Pot-hole area
River
Donoho Point
Boulder
LAKE
THE MAP OF GRAND TETON
D IN 1899, SCALE 1:125,000
DUBOIS
LANDER
19
24
25
26
35
36
34
33
32
28
3
2
4
5
6
7
8
9
17
18
19
20

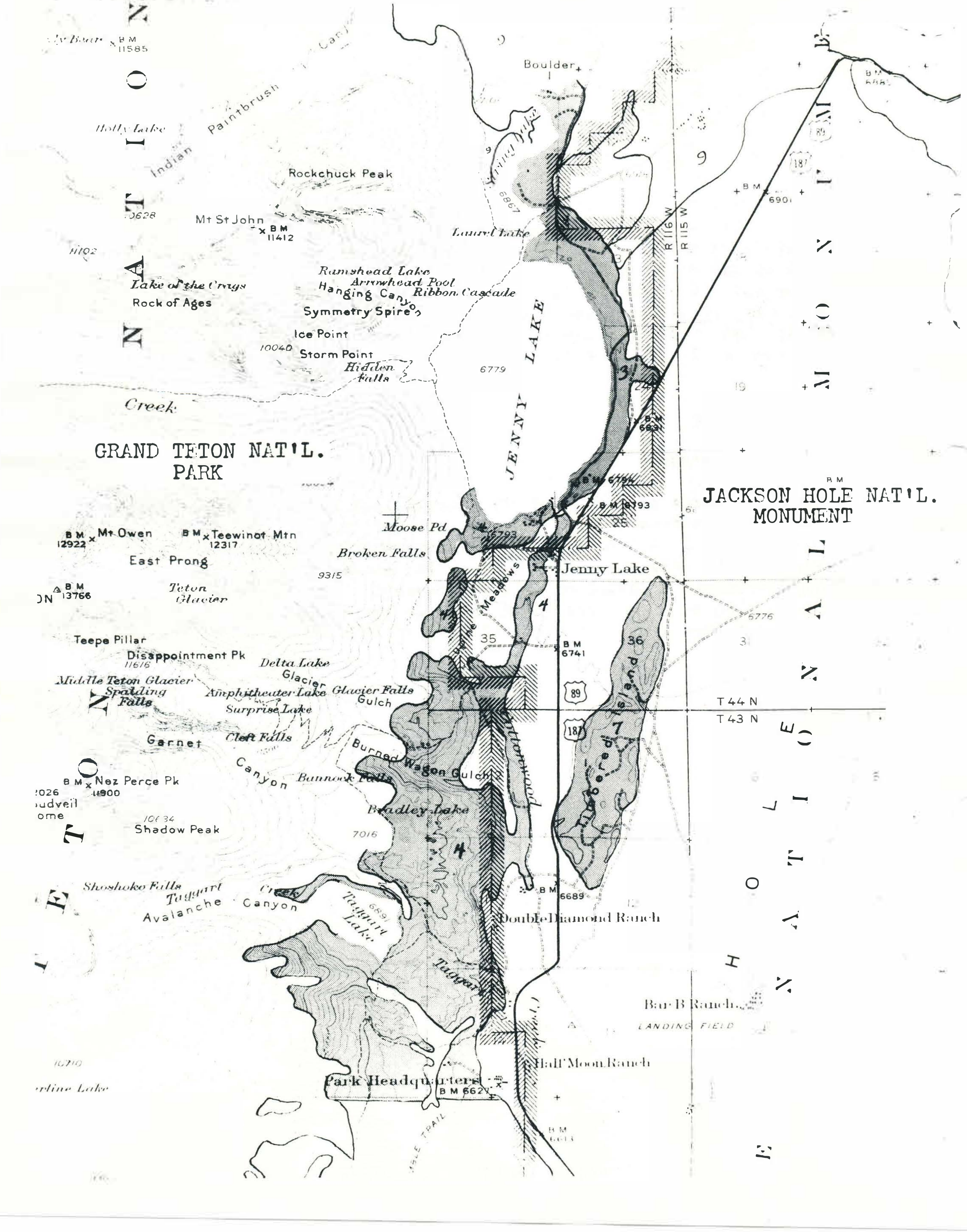
GRAND TETON NATIONAL PARK
and
JACKSON HOLE NATIONAL MONUMENT

Unit No. 1	3,000 acres
Signal Point	1,322 infested trees

During the 1948 spring control project, 1,200 acres of this area was spotted and treated. Shown as No. 1 on the map, the treated portion is reinfested to .27 infested trees per acre; the untreated portion, No. 1A, has .56 infested trees per acre. The attacks on the additional acreage increased from a very light infestation in 1947 to the present figure. It is recommended that the entire area be spotted and treated during the coming project. To do the work thoroughly will require between 400 and 500 man-days.

Unit No. 2	1,800 acres
Burnt Ridge	125 infested trees

The 1948 control work was very effective in reducing the infestation on Burnt Ridge. The only work recommended for the spring of 1949 is to treat the small islands of timber between Burnt Ridge and the Snake River where no control work was done last year and to scout along the edges of Burnt Ridge and pick up any infested trees found. The small patches of timber are in "pot holes" and run about two acres each in size. There are approximately 46 patches. The infestation averages .4 infested trees per acre. Because the areas are small, a three man crew with a Jeep should be able to treat all the trees without formal spotting. Ten to fifteen man-days should be sufficient to do the job.

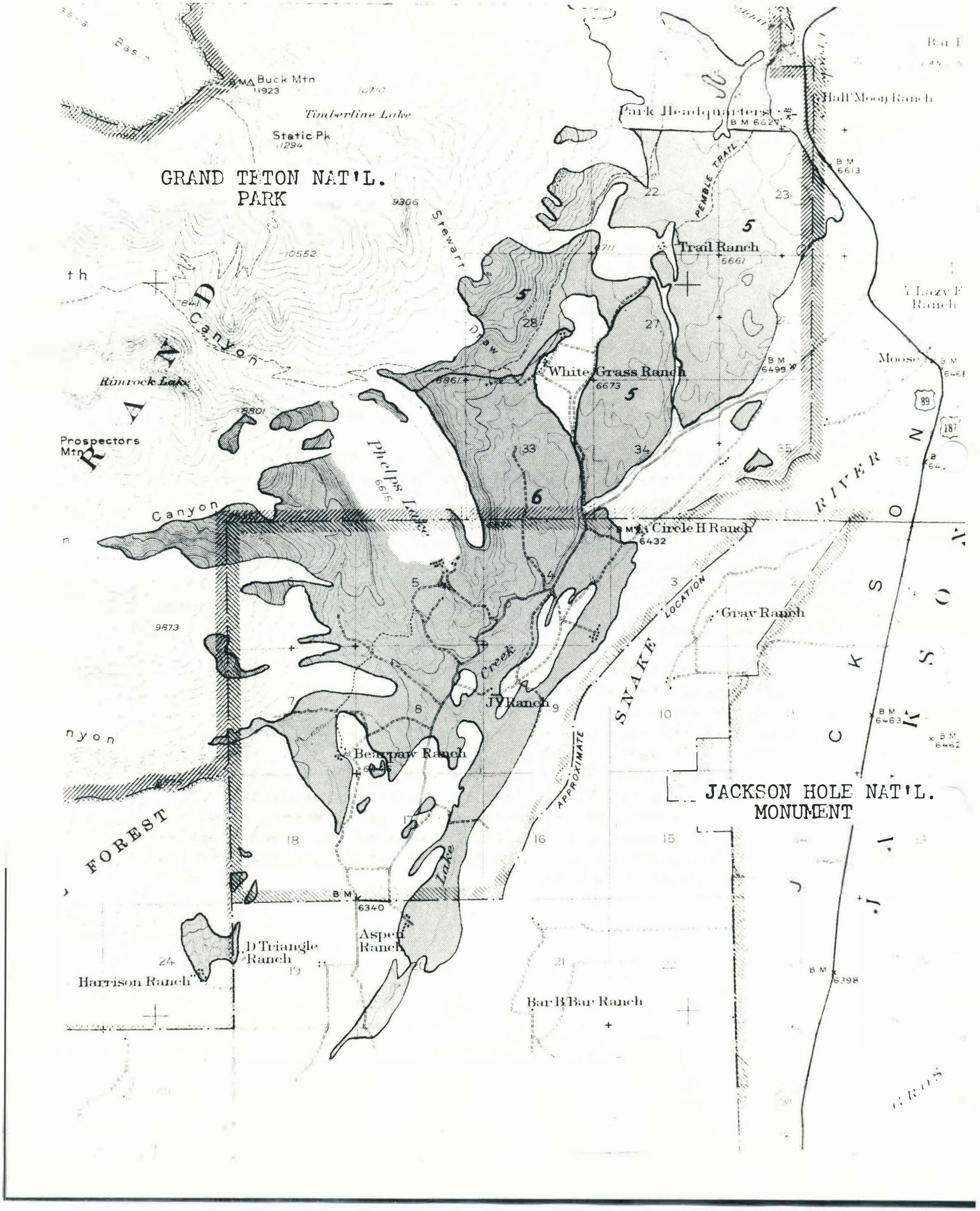

GRAND TETON NAT'L. PARK
JACKSON HOLE NAT'L. MONUMENT
GRAND TETON NATIONAL FOREST
TETON NATIONAL FOREST
Boulder
Holly Lake
Indian Paintbrush
Rockchuck Peak
Mt St John
BM 11412
BM 11585
10628
11102
Laurel Lake
Lake of the Crags
Rock of Ages
Ramshead Lake
Arrowhead Pool
Hanging Canyon
Ribbon Cascade
Symmetry Spire
Ice Point
10040
Storm Point
Hidden Falls
Creek
JENNY LAKE
6779
R 116 W
R 115 W
BM 6901
BM 6831
BM 6784
BM 6793
9
19
25
31
24
Moose Pd
Broken Falls
9315
BM 12922
Mt Owen
BM 12317
Teewinot Mtn
East Prong
BM 13766
Teton Glacier
Jenny Lake
Meadows
4
35
36
BM 6741
6776
Teepe Pillar
Disappointment Pk
11616
Delta Lake
Glacier Gulch
Middle Teton Glacier
Amphitheater Lake
Glacier Falls
Spalding Falls
Surprise Lake
89
187
T 44 N
T 43 N
Cleft Falls
Garnet Canyon
Burned Wagon Gulch
Bannock Falls
Cottonwood
Timbered Island
7
BM 11900
Nez Perce Pk
Shadow Peak
10634
Bradley Lake
7016
4
BM 6689
Shoshoko Falls
Taggart Creek
Avalanche Canyon
Taggart Lake
6889
Double Diamond Ranch
Taggart
Bar B Ranch
LANDING FIELD
Half Moon Ranch
Park Headquarters
BM 6627
TRAIL
BM 6618

Unit No. 3	700 acres
Jenny Lake	28 infested trees

This narrow strip along the shore of Jenny Lake is not seriously infested but because of the large public camp ground and the high use this area receives, the annual cleaning up of any infested trees should be taken for granted. Thorough spotting and treating is recommended. Because string is objectionable in this area of high public use, if all infested trees are first spotted and marked to the nearest road, its use could be avoided. Between 40 and 50 man-days are estimated to do the work.

Unit No. 4	2,500 acres
Headquarters	710 infested trees

About 1,000 acres of this unit was treated last spring. The treated area includes most of the heavily stocked LPP type; it is infested to the extent of .48 trees per acre. The untreated portion has a mixed stand of lodgepole pine, spruce, and alpine fir. It has a light, incipient infestation that has probably been a source of reinfestation to other park areas. During the spring control project it is hoped that a very thorough cleanup of this area can be effected.


GRAND TETON NAT'L. PARK
JACKSON HOLE NAT'L. MONUMENT
Basin
Buck Mtn
11923
10710
Timberline Lake
Static Pk
11294
9306
Stewart
Draw
10552
Canyon
Rimrock Lake
8801
Prospectors Mtn
RANGE
Phelps Lake
6615
Canyon
9873
nyon
FOREST
Park Headquarters
B M 6527
Half Moon Ranch
B M 6613
PEMBLE TRAIL
22
23
5
Trail Ranch
6661
27
28
White Grass Ranch
6673
6861
Moose
B M 6499
33
34
35
6
89
187
Circle H Ranch
6432
RIVER
SNAKE
LOCATION
APPROXIMATE
Gray Ranch
3
4
5
Creek
JY Ranch
8
9
10
7
Bearpaw Ranch
17
18
16
15
Lake
B M 6340
B M 6463
B M 6462
JACKSON
D Triangle Ranch
Aspen Ranch
24
19
Harrison Ranch
21
22
Bar B Bar Ranch
B M 6398

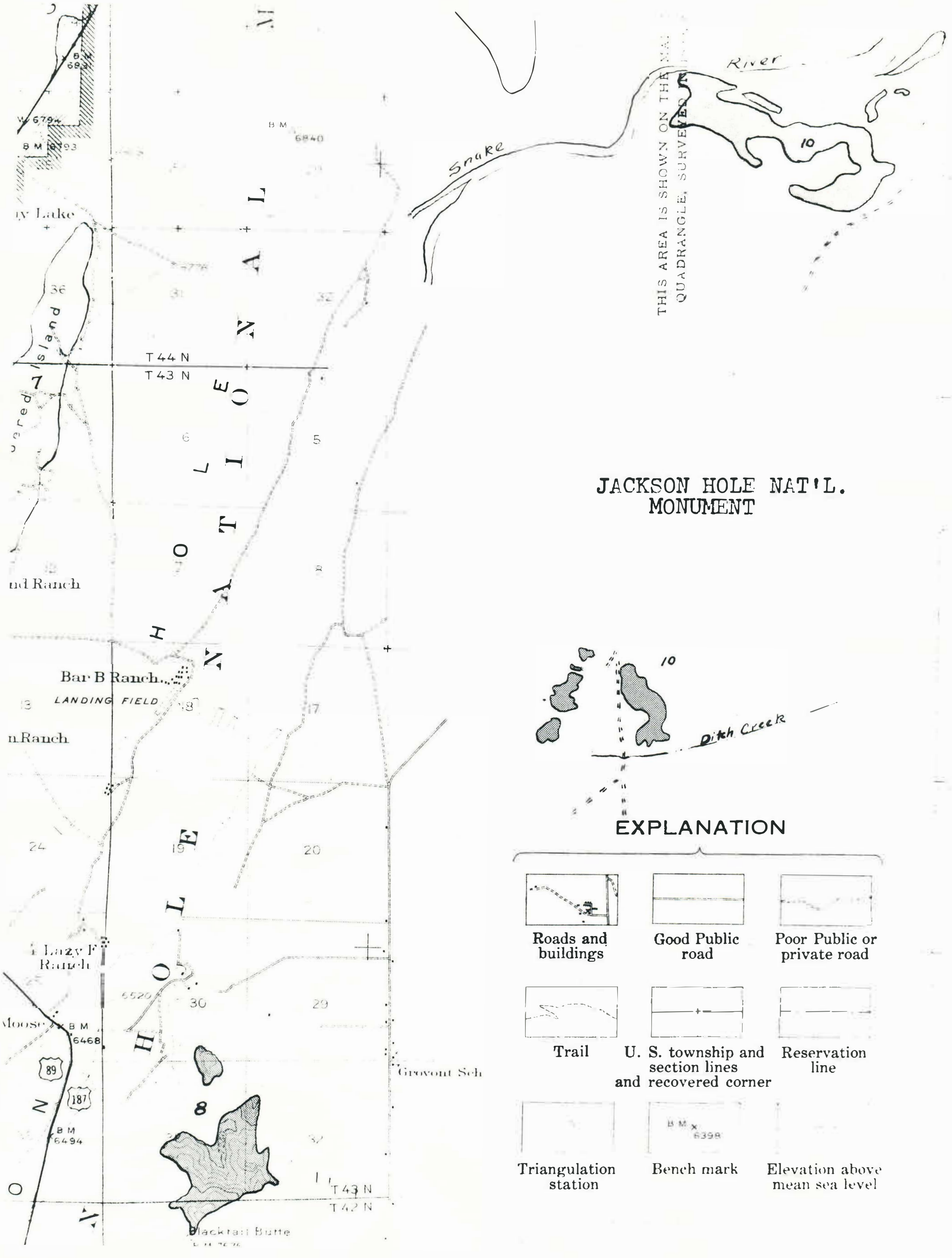
Unit No. 5	3,000 acres
Windy Point	729 infested trees

In an attempt to include all of the possible sources of reinfestation to park areas, 1,100 acres of marginal type have been added to this unit. The added area is similar to that added to the Headquarters unit; it is subalpine and runs more to spruce, Douglas fir, and alpine fir than lodgepole pine but it is infested to .11 trees per acre--in this case, a high percentage of the LPP stocking.

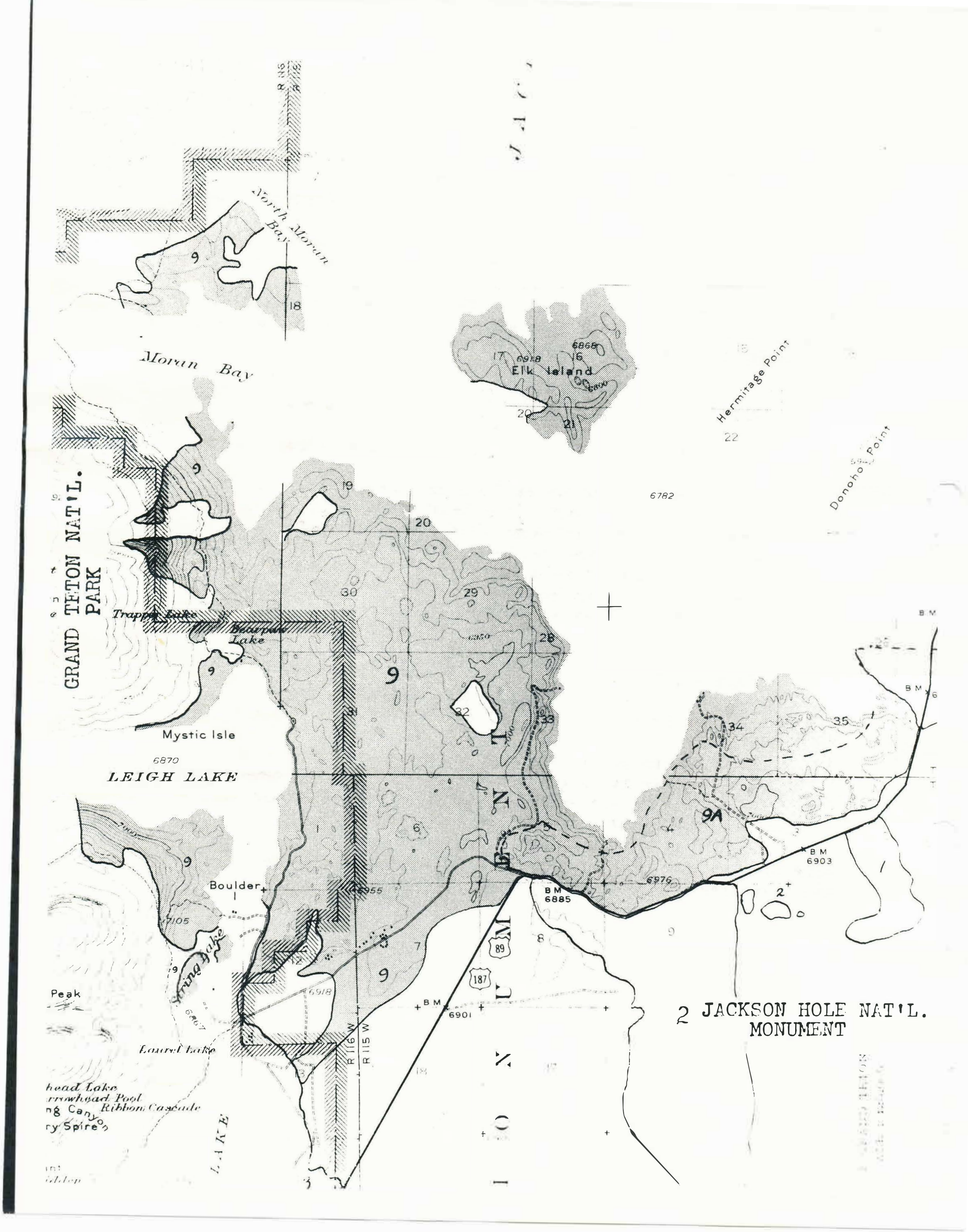
Unit No. 6	4,150 acres
JY Ranch	3,949 infested trees

The source of reinfestation of this area is thought to be the marginal type along the foothills west of Phelps Lake where 1,650 acres of mixed type has been added to this unit. The type in this new area was formerly thought to be too thin in lodgepole pine to support a serious infestation. However, investigation proved that pockets of pine in the stands are heavily infested, in some instances with large groups of attacked trees. Sample strip showed an infestation of 1.53 trees per acre. The treated portion (2,500 acres) averages .57 infested trees per acre.

Control measures in the rougher parts of this area will be very difficult because the slopes are steep and rocky. All of the work in the higher areas will have to be done with pack stock. It is suggested that the area be spotted completely before treating is undertaken. From accurate maps showing the location of the infested trees, treating operations can be more efficiently planned. Because of the difficulty of working this area, it is estimated that 320 man-days spotting will be necessary. Treating, however, should show a relatively high man-day production because of the greater number of infested trees per acre. The total estimated man-days both for treating and spotting is 1100.


THIS AREA IS SHOWN ON THE NA
QUADRANGLE, SURVEYED
Snake River
10
B M 6840
B M 6793
ıy Lake
Island
T 44 N
T 43 N
7
36
31
32
6
5
8
nd Ranch
Bar B Ranch
LANDING FIELD
18
17
13
n Ranch
24
19
20
Lazy F Ranch
25
6520
30
29
Moose
B M 6468
89
187
B M 6494
8
Grovont Sch
T 43 N
T 42 N
Blacktail Butte
JACKSON HOLE NATIONAL
Ditch Creek
10
EXPLANATION
Roads and buildings
Good Public road
Poor Public or private road
Trail
U. S. township and section lines and recovered corner
Reservation line
Triangulation station
Bench mark
Elevation above mean sea level
B M 6398

JACKSON HOLE NAT'L.
MONUMENT


North Moran Bay
Moran Bay
Elk Island
Hermitage Point
Donoho Point
6782
GRAND TETON NAT'L. PARK
Trapper Lake
Bearpaw Lake
Mystic Isle
6870
LEIGH LAKE
Boulder
String Lake
Laurel Lake
Peak
9
9A
BM 6885
BM 6903
BM 6901
6976
6955
6918
6867
7105
89
187
R 116 W
R 115 W
2 JACKSON HOLE NAT'L. MONUMENT

Unit No. 7	600 acres
Timbered Island	114 infested trees

During the fall of 1947, 884 infested trees were treated on this unit. Last spring the area was agaim scouted thoroughly and an additional 26 trees were treated. There is no question but that the unit was well cleaned up. The 1948 reinfestation can only be accounted for by flights into the area from outside. Spotting and treating should be done in 50 to 60 man-days.

Unit No. 8	250 acres
Blacktail Butte	125 infested trees

An infestation was discovered on Blacktail Butte early in 1948 by Park Service personnel. During the last few days of the spring control project, as many infested trees as could be found were marked and treated. It was too late in the season to effect a thorough cleanup; in fact it was probably too late to reap much benefit from control. The area should be thoroughly spotted and treated. From 35 to 40 man-days will be required.

Unit No. 9	8,500 acres
Jackson Lake	510 infested trees

The recommendations are to treat 1,550 acres in the area shown as 9A on the map where it is estimated that 248 infested trees will be found. Sample strip through the rest of this unit showed only an endemic infestation of .03 infested trees per acre.

This area will require an estimated 80 man-days spotting and 50 man-days treating.

Unit No. 10 450 acres
Ditch Creek and Snake River 284 infested trees

This area includes several small patches of timber north of Ditch Creek in the Monument and a fringe of timber along the Snake River farther north. These areas were discovered by aerial scouting late in the summer. The patches are small and easily accessible. Control measures should not be difficult. An estimate of 80 man-days for the work should be sufficient.

In addition to the unit areas given for the Teton National Forest, Grand Teton National Park, and Jackson Hole National Monument, many miles of reconnaissance strips were run to make sure that all areas of infestation were known. To be sure, the reconnaissance strips were extensive examinations but sufficiently intense to record any sizable spots of infestation. And an aerial survey was also made of the entire valley twice during the summer. It is possible that small centers of infestation have been missed but it is not likely that any large areas have been overlooked.

As an example of the reconnaissance strips, 65 miles of strip were run between Moran, Wyoming and the south entrance of Yellowstone Park. Between the south entrance and West Thumb in Yellowstone Park an additional 48 miles of sample were run. These strips were much the same as on the more intensive surveys except that they were sometimes plotted on wide angles out from roads, sometimes as meandering strips where the type was indefinite such as around Lewis Lake, or along the Snake River. Many man-days were spent too, in searching for infestation where no strip was run--only a record kept of the infested trees seen. When more than a scattered few attacked trees are reported under this system, sample strips are then plotted in the locality. However, in all this area not more than an occasional attacked tree--not even what could be expected as endemic were found.

Survey Organization and Technique of Sampling

Survey estimates made in 1947 under the direction of the Bureau of Entomology and Plant Quarantine were not adequate for accurate estimates, in many instances, on control units. These inaccuracies caused organizational difficulties during the project. In order to obtain more reliable data, a much larger survey organization was built up for the survey of 1948. The flight and attack period of the mountain pine beetle in the Targhee - Teton area occurs from mid-July to mid-August, making it impractical to start survey work before August 20. Weather conditions are such that field work cannot be effectively done much after October 20. The survey was organized to cover the entire area within the two month period on the basis of a 5% survey of control areas and a more extensive coverage of all adjacent areas. The extensive examinations were in the nature of a reconnaissance sampling to be followed by a higher percentage of survey when infestation was found. At the time the survey was organized, it was not known how much acreage would have to be surveyed but it was thought that the area would be about 250,000 acres. Plans were made on the basis of that figure. Actually, when the work was finished, 411,604 acres had been surveyed and reconnaissance strips had been run on many thousands of acres in addition. The goal of 5% sample was not realized on all areas. However, on all important areas on the Targhee and Teton the coverage obtained was from 3 to 6 percent. The average coverage on the Targhee was 3.7%, Teton 4.5%, G.T.N.P. and Monument 5.4%.

The method of sampling was by strips one chain wide. All infested trees were recorded for each ten chains of distance. Maps showing the strip location, type boundaries, roads, and other data were made by the strip runners as the strip was run. It was hoped that information of value could be obtained to aid in the planning of control work. Such information as was obtained is given under the description of the units. However, the men employed on the survey were not adept at mapping and the value of the information obtained relative to road construction chances is very limited. It is also felt that a greater number of strips at much closer intervals would be necessary before topography, roads or other detail could be mapped with sufficient accuracy. From the strips and maps, however, type maps have been made that in many instances, with the knowledge already at hand, are fairly accurate. They are included in this report with the units discussed. Negatives of these maps will be furnished the Regional office so that copies on a larger scale can be made for field use on control work.

To start the survey a training camp was set up at Alpine, Wyoming and training courses were laid out to give the men training in pacing, compass work and mapping. Instruction was given in the matter of recognizing infested trees and the recording of such data as they were to take. A set of training instructions and outline of the training course was prepared and given to each crew member. Most of the men employed had had experience on the spring control work and were picked for the job because they had proved outstanding during the spring work. They ranged from laborers to advanced students. Most of them were very satisfactory workers.

A new feature in surveys was adopted. Because it was the plan for these men to work on their own during the day and because so much depended on the proper recording of the strip data, it was thought necessary to have some method of checking on the strips. To enable a checker to follow the strip and to have proof that all the strip had been satisfactorily run, the strip runners were required to lay a string line as they ran the strip. The string was laid on the ground and was tagged each 20 chains showing the distance out and the strip runners initials. These lines proved very effective in correcting errors in the work. A check of the pacing, compass line and the recording of infested trees was made from time to time on every man in the crew. An added advantage of the string line became apparent when the men began to regard it as a "safety line". It would provide the means of finding a man injured and unable to return by himself. During the long hunting season in Wyoming the possibility of injury from hunters became a distinct hazard. During that period some of the men stated that they would not like to run strips without string.

Setting up the first camp and the training courses was completed August 25. On the morning of August 26, training began. There were at that time 18 men in the camp. These included Mr. Robert E. Newcomer from the Teton National Forest and who was assigned to the project to assist in the supervision throughout the survey. Mr. Roy Eaton from the Boise Forest who had the job of moving and building the numerous camps, supplies, property, and keeping records and time slips, 13 strip runners, cook, flunkey and the writer. By the middle of the following week the number had increased to 20 men but from then on the number decreased for various reasons and at no time thereafter was there a full crew.

For transportation two Army weapons carriers, two pickups and a Universal Jeep was used. The jeep was furnished by the National Park Service. During October the weapons carriers were called in and a second Jeep was furnished by the Park Service. Including the first setup, camp was moved seven times during the survey.

A man-day breakdown is given for the job.

Training	21	
Camp Moves, Cook, Flunkey	197	
Supervision	105	Contributed time
Annual Leave	50	
Sample Strip	453	
Total	826	

Survey Cost

Wages - Includes $701.44 annual leave	$ 9,150.73
Subsistence - $1,513.36 less $921.50 board charge	591.86
Mileage - 3,556 @ 7½¢ - $257.81	257.81
3,938 @ 10¢ - 393.80	393.80
Airplane - 9 hours @ $20.00	180.00
Cost to return carriers to Salt Lake City, est.	135.00
String	575.00
Total	$11,284.20

In addition to the above cost, considerable mileage on a BEQP truck and on the Park Service Jeeps was not charged. Contributed time by Terrell and Newcomer is not in the cost. The $591.86 board cost is the difference between the cost of supplies and the deductions for board. There were, however, three men, Terrell, Newcomer and Eaton on whom no board deductions were made.

Considering the contributed time, mileage, etc., the total cost of the survey would be approximately $12,700.00.